THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | APRIL 29, 1985 | VOL. XIX, NO. 17



Changing the corporate landscape
Special Report on micros in big business
Follows ID/16

In Depth
A primer for friends and lovers of DP professionals
Follows 46

Net Effect
Wang takes wraps off gateways to IBM/**13**

Dead aim
TRW sets sights on IBM service mart/**67**

Study finds users plan hefty power increases

By John Desmond
CW Staff

FRAMINGHAM, Mass. — Users of large-scale IBM and compatible computers expect to increase their processing power by 20% to 30% during the next three years — a rate that equals or exceeds expectations of users prior to the industry's boom years of 1983 and 1984.

The findings are based on a survey of 1,100 sites, or 6% of the U.S. installed computing base, by International Data Corp., a market research firm here that has been conducting the survey since 1972. The survey addressed users of IBM 370, 4300, 3030 and 3080 series mainframes and compatibles.

According to IDC, 1984 was the first year that personal computer sales revenue surpassed that of mainframes. "The days when mainframe was *the* market will never return," the study stated. Personal computer penetration at large-scale processor sites will continue at a rapid pace in 1985; IDC projected a 60% increase in the installed microcomputer base this year.

> *Micro sales in 1984 surpassed those of mainframes for the first time.*
> — **International Data Corp.**

Despite personal computer growth, machines and software based on IBM's 370 architecture — or von Neumann one instruction per cycle processing — account for more sales than any other architecture. Sales of 4300 and 3080 series mainframes in 1984, combined with associated peripherals and software, brought IBM three times the revenue that sales of personal computer products did, the report said.

See **IDC** page 10

TOP OF THE NEWS

Mini bucks for mini makers. With the exception of Prime, a string of minicomputer vendors reported plummeting quarterly profits. **Page 2.**

■

Still a gulf between them. Micro software vendors may think otherwise, but the Micro Managers Association said the rift between itself and the vendors over proposed antipiracy standards remains. **Page 5.**

■

Bottoms up. Arco Chemical Co. reaped hefty rewards when its DP department began listening carefully to microcomputer end-user complaints. **Page 8.**

Send in the clones. Televideo, Zenith and Corona each rolled out desktops compatible with IBM's Personal Computer AT. **Page 11.**

■

Corporate users with private-line networks may save up to 20% on existing communications bills using a recently announced AT&T service. **Page 53.**

■

Twenty years and running. IBM's 1964 vintage 1800 Data Acquisition and Control System still commands a flock of proponents, despite company plans to discontinue support. **Page 61.**

■

Broker picks fiber optics for bypass

Prudential-Bache turns to T1 channels for data

Third in a four-part series on corporate bypass strategies.

By John Dix
CW Staff

NEW YORK — Prudential-Bache Securities, Inc. uses a fiber-optic bypass system between two of its buildings here that saves the company 60% to 80% of the cost of standard local facilities while providing advanced data communications capabilities and insulation from rate hikes.

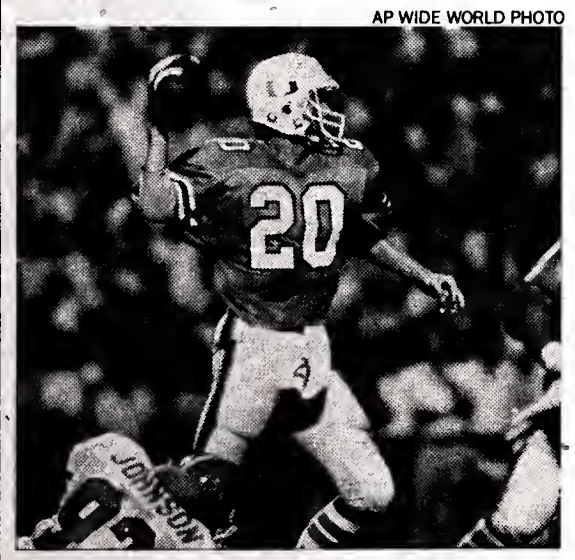
Prudential-Bache, one of the largest worldwide investment firms, last year moved its corporate headquarters from Gold Street in Manhattan to the new Prudential-Bache building a few blocks away on Water Street.

Because the company's data center and some other company assets and personnel remained at the former location, the move created a massive communications need between the two sites, according to Daniel Minoli, associate vice-president of systems planning and engineering with the corporate communications department.

Communications is a cornerstone technology in the financial services industry, and this holds true for Prudential-Bache. The company spends close to $100 million a year on communications — a corporate expense surpassed only by compensation, according to Steven Steinberg, an associate vice-president with corporate communications in

See **BYPASS** page 4

AP WIDE WORLD PHOTO



Digital draft

This year's regular and supplemental NFL pro football draft, featuring the University of Miami's Bernie Kosar, will be aided by a pair of DEC VAXs. Page 15.

Symphony, 1-2-3 get face-lifts

By Eric Bender
CW Staff

NEW YORK — Lotus Development Corp.'s 1-2-3, the all-time champ of IBM Personal Computer software charts, will get its first major face-lift when an upgraded version is shipped this fall, the company announced here last week. Lotus also introduced a second release of its Symphony desktop productivity program, scheduled for delivery this summer.

The most striking enhancement for both packages is the ability to bypass the IBM micro's 640K-byte limit on directly addressable memory, reaching up to 4M bytes of additional random-access memory under a bank-switching memory management scheme jointly developed with Intel Corp. (see story page 6).

The added memory capability is a response to requests from veteran spreadsheet users who keep hitting the 640K-byte barrier, Lotus Chairman Mitchell Kapor said. He estimated that users who add 2M bytes of RAM will be able to build spreadsheets five to 10 times their present maximum size.

Lotus also introduced Symphony Link, a software add-on product that offers IBM 3270 terminal emulation within the Symphony environment and allows MIS departments to create their own micro-to-mainframe connections, Kapor said.

The announcements are good news for Lotus users, industry analysts generally agreed, although some felt the moves overemphasized Symphony at the expense of the earlier package. "I'm disappointed that [Lotus is] trying to push Symphony first," commented Aaron Goldberg, director of Microsystems Services at International Data Corp. in Santa Clara, Calif. "Most people are still using 1-2-3."

See **LOTUS** page 6

NEWSPAPER

NEWS

Mini slump deepens: DG profits down, closings planned

By Peter Bartolik
CW Staff

Capping off a generally bad week for minicomputer companies, Data General Corp. last week posted lower than expected second-quarter profits and said it will shut down production for two weeks this summer in anticipation of a continued slump.

A few days earlier, Wang Laboratories, Inc. reported that its third quarter was worse than earlier projected, with profits down 66% and revenue growth of only 2%. Last week, Digital Equipment Corp. reported third-quarter profits were down 10% and hinted that fourth-quarter revenue may not meet expectations.

Going against the tide of bad news was the 19% profit increase reported last week by Prime Computer, Inc., which historically has been less dependent on OEM customer sales than DEC and DG.

In other developments, Burroughs Corp.'s Memorex Corp. subsidiary announced layoffs, and Control Data Corp. announced a first-quarter loss of $9.2 million.

DG announced in February that second-quarter profits might not exceed year-earlier profits. But the news last week was significantly worse, with profits falling to $9.1 million, or 34 cents per share, down 36% from the second quarter of 1984, when profits were $14.2 million, or 55 cents per share. Revenue in the second quarter increased to $320.2 million, from $273.9 million, but the increase did not offset increased expenses.

Furthermore, DG President Edson D. de Castro said, "Earnings for the [fiscal] year may not exceed those of fiscal 1984, and earnings for the 1985 third quarter may not exceed those of the just-reported second quarter."

He said the company has reduced hiring plans and will shut down U.S. manufacturing operations for two one-week periods coinciding with the Memorial Day and Fourth of July holiday weekends.

Like DG, Wang announced financial results much worse than the company had earlier projected. Wang had earlier announced plans to shut down manufacturing for two weeks. Instead of the 30% to 40% drop it projected last month, Wang's profits dropped 66% to $17 million, or 12 cents per share, from $49.8 million, or 36 cents per share, a year earlier. Revenue inched up to $552.7 million from $543.5 million, short of Wang's earlier 10% growth projection.

DEC posted profits of $91.7 million, or $1.52 per share, down from the third-quarter 1984 profits of $101.8 million, or $1.77 per share. While that was within the range of projections made by securities analysts in recent weeks, it was far below the $125 million projections of about one month ago. DEC said revenue increased to $1.14 billion from $978.9 million a year earlier.

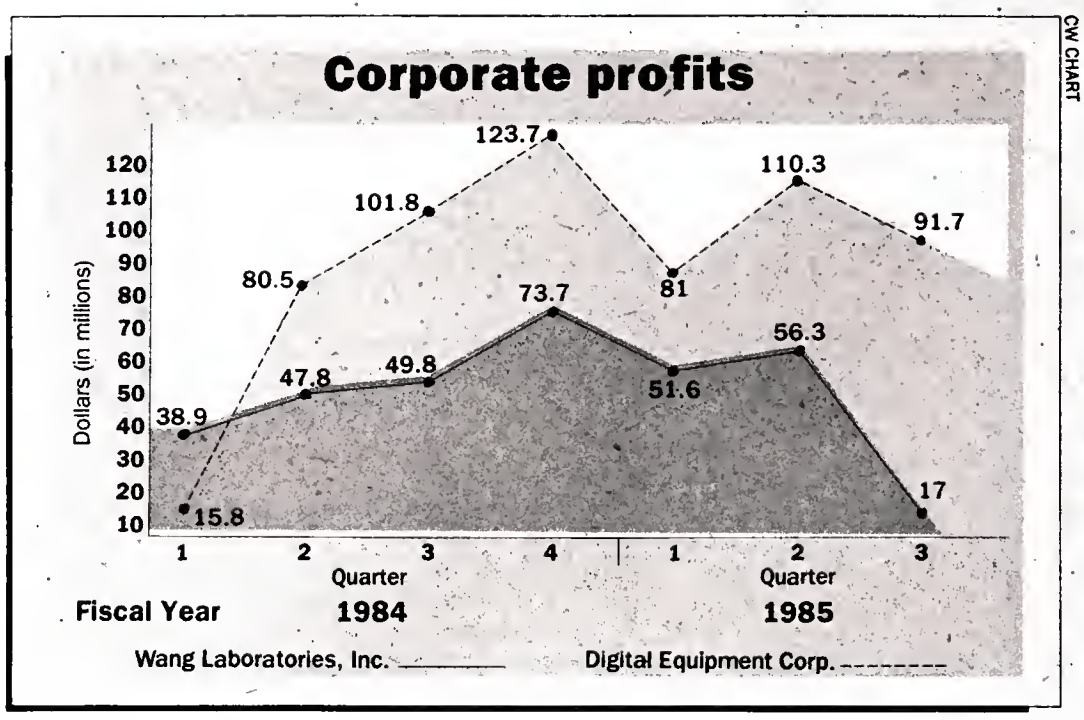
Contributing to DEC's results was the early delivery of 140 VAX 8600s the company said were shipped before the scheduled April 1 date. However, the company noted, it may not be able to ship new products fast enough to meet demand over the next few months, and "this may have a short-term effect on revenue."

In contrast, Prime posted profits of $11.9 million, or 25 cents per share, an increase from the year-earlier profits of $10.2 million, or 21 cents per share. Revenue for the quarter just ended was $175.8 million, up 21% from $145.6 million a year earlier.

Peter Lowber, minicomputer analyst with the Yankee Group in Boston, said the sudden downturn in vendor fortunes was somewhat surprising in light of user surveys indicating relatively strong purchase plans and the need to serve large numbers of personal computers. But he said the trend toward greater MIS involvement in departmental systems planning may be slowing down user purchases.

CDC charged off $11.6 million against profits in anticipation of the likely loss of its Commercial Credit Co.'s deposits in the deposit guarantee fund for Ohio-chartered savings and loans banks.

CDC, which acknowledged but declined to specify the size of "a significant reduction" of the work force in its computer peripherals group, said its information services and products group posted a pretax operating loss of $16.3 million, compared with pretax profits of $15.9 million a year earlier. The $9.2 million loss, or 24 cents per share, compared with profits of $31.7 million, or 82 cents per share, which included a nonoperating gain of $11.9 million. Revenue for the quarter inched up to $1.2 billion, from $1.19 billion a year earlier.



Informatics nixes second bid

WOODLAND HILLS, Calif. — Informatics General Corp. said last week that it had rejected a second cash offer for the company by Sterling Software, Inc., which had raised its original bid by $1 a share.

Following the rejection of the original $25 a share bid [CW, April 22], Sterling's subsequent offer raised the total acquisition value of Informatics to about $135 million, although Sterling already had acquired almost 10% of Informatics' outstanding shares. Informatics rejected the latest offer as inadequate and reiterated its intent to explore other alternatives.

Sterling, which markets some 20 software products for IBM mainframes, last week reported second-quarter profits of $641,000, or 14 cents per share, on revenue of $6 million. A year earlier, it posted profits of $340,000, or 8 cents per share, on revenue of $4.8 million.

Informatics offers a diverse product line of software and services and reported revenue of $193 million in 1984. Profits for the year were $4.7 million, down from $8.5 million in 1983.

Who's news?

Hard as we try to provide the most complete information available, some stories never reach us.

Are you involved in an unusual application of DP technology? Is something in your DP shop not working as designed? Know any unsung heroes?

If so, we'd like to hear from you. *Computerworld* has established a reader hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Donovan White, assistant managing editor.

CORRECTIONS

The Series II+ Twinax Protocol Converter recently announced by KMW Systems Inc. of Austin, Texas, emulates a 5251 Model II, not a 5250 Model II as was reported [CW, April 8].

The contact for seminars attributed to Technology Solutions, Inc. [CW, April 22] is On-Line Software International, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024.

Starting wages for data processing personnel in Hawaii are 15% lower than the national average, not 15% higher than the national average as reported in the article "DP salaries up 5.9%, study reports" [CW, March 4].

NEWS SUMMARY

SPECIAL REPORT
Micros in business/ **Follows ID/16**

The conflict between Adapso and the Micro Managers Association over anti-piracy proposals continued unabated/**5**

An unsuccessful attempt to collect data on maintenance expenses spurred a software project that has given a chemical firm a huge payback/**8**

Corona Data Systems, Zenith Data Systems and Televideo Systems unveiled micros the firms say are compatible with the IBM Personal Computer AT/**11**

CW at Cincom Users Group: Cincom announced DEC VAX support for Mantis, its fourth-generation language/**12**

CW at DP Expo: Federal DP systems are unfairly criticized, according to the keynote speaker . . . Another speaker advocated abandoning the government requirement that federal agencies prepare formal computer security risk analyses . . . An official from the Office of Management and Budget defended the federal DP contracting policy/**13-14**

The National Football League has added two DEC VAX-11 superminis to its team as part of a plan to link diverse hardware at all team offices/**15**

A manufacturing firm solved its report distribution problem by borrowing an idea from a supermarket/**16**

A seminar of business executives discussed what information MIS managers should be trying to produce/**17**

To prosper in the 1980s, software vendors were told they must teach the world what data really is/**19**

IBM's increasing focus on software creates some unique opportunities and hazards for vendors, an industry analyst said/**22**

This year's Hannover Faire in West Germany will be the last one of its kind/**32**

IN DEPTH
The DP professional/**Follows 46**

Washington Update/**18**
International Report/**28**
Calendar/**33**

EDITORIAL/36
SOFTWARE & SERVICES/39
MICROCOMPUTERS/47
COMMUNICATIONS/53
SYSTEMS & PERIPHERALS/61
COMPUTER INDUSTRY/67

SUSPENSE

How did IBM's rookie sort (Rel 7.0) do in its first meeting with "Lefty" SyncSort? Read all about it!

or Call (201) 568-9700.

Get the inside scouting report.

It is one of those historic moments in the Annals of Sort! The very first appearance in competition of IBM's new DFSORT, Release 7, in the tough-as-nails MVS/XA League. Will the kid be able to live up to his advance press notices?

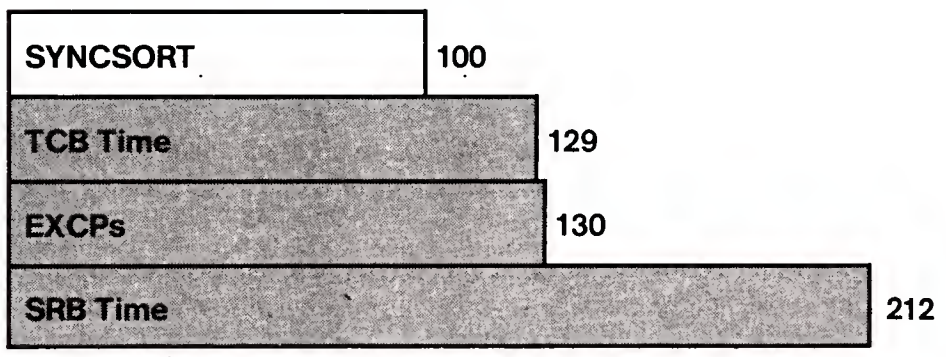
Confidently DFSORT7 strides to the plate... knocks the dirt out of his spikes... hitches up his britches... raises his sort assists.

Then, as sorting fans everywhere gasp in amazement, he lifts his arm lazily and points toward the centerfield flagpole, thousands of bytes away. The kid is going to try to emulate Babe's mighty homerun shot!

Moments later, SyncSort winds up... a curving white blur is seen... and... and...

There is no joy in Armonk! DFSORT7 struck out every time it came to bat against the latest release of SyncSort (Release 2.SE) in a recent series of MVS benchmark tests. (In sorting, as in most other forms of human endeavor, it's a long way from *baby* to *Babe*.)

The bar charts below tell the story more eloquently than we can:



That didn't surprise us too much. **After all IBM isn't known for its sorts... and we're not known for our computers.**

We stick to what we do best. Maybe some day they will too. But in the meantime, you're faced with a choice of sorts. You can use their sort, which gets the job done (eventually). Or you can use our sort. We're a little faster. (We're also very modest.)

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Extenders boost net

Financial benefits aside, Prudential-Bache Securities, Inc. has realized some technological advantages of its bypass network.

One way the company is taking advantage of the fiber-optic system it recently installed is to use computer channel extenders, according to Prudential-Bache Associate Vice-President Daniel Minoli.

These extenders enable remote peripheral controllers to be configured as though they were supported locally on IBM bus and tag cables.

Some of the controllers will be used to support clusters of personal computers used as IBM 3270-type terminals. But instead of giving each micro 3270 emulation capability and wiring coaxial cable to each one, Prudential-Bache supports the processors with its Northern Telecom, Inc. SL-1 private branch exchange and a controller that also performs protocol conversion, Minoli said.

"We wanted to avoid the knee-jerk response of putting cable in every time terminal capabilities were needed," the vice-president said. The decision to use the private branch exchange to support the personal computers was also influenced by limited space to run cable.

Prudential-Bache uses an RS-232-to-four-wire adapter for each personal computer and runs the data with simultaneous voice to the SL-1. On the other side, the PBX provides an asychronous RS-232 interface that is connected to the controller. The controller, which is configured as a local device through the channel extender over the bypass link, provides protocol conversion, making each micro look like a 3270 terminal.

It would have cost $1,500 to $2,000 per processor to have provided each machine with emulation boards and cabled each one individually, Minoli said. "We have 300 personal computers at that site, so that solution would have cost us $600,000. We've done it in a way that is an order of magnitude cheaper."

— John Dix

BYPASS from page 1

charge of the financial analysis group. Much of that money is spent supporting Prudential-Bache's 300 branch offices with voice, data and value-added communications services, such as the Dow Jones News & Retrieval Service.

Prudential-Bache's trader and operation divisions are even more dependent on communications than the branch offices. With the move to Water Street, the company anticipated traffic between the buildings that included intracompany voice communications and data flowing between the host information processing systems — which include IBM 3084 Models Z and X duplex, an IBM 3081 Model K, an IBM 3033 Model MP and an IBM 4381 Model II — and a large population of users in headquarters.

Although microwave and infrared bypass technologies were considered as means to connect the two buildings, a housing complex sitting between the locations made their use impractical, Minoli said.

Aware of the situation, New York Telephone Co. offered to link Prudential-Bache's buildings with a fiber-optic bypass network that would be made available on a 60-month lease. "Telephone companies are going that way," Minoli said. "They are saying, 'If you want to go bypass, go bypass, but come with us. We'll give you the state of the art, the digital feature, the noise resilience, the good bit error-rate statistics, diversification, constant monitoring and dual fallback positions.' "

Six months to complete system

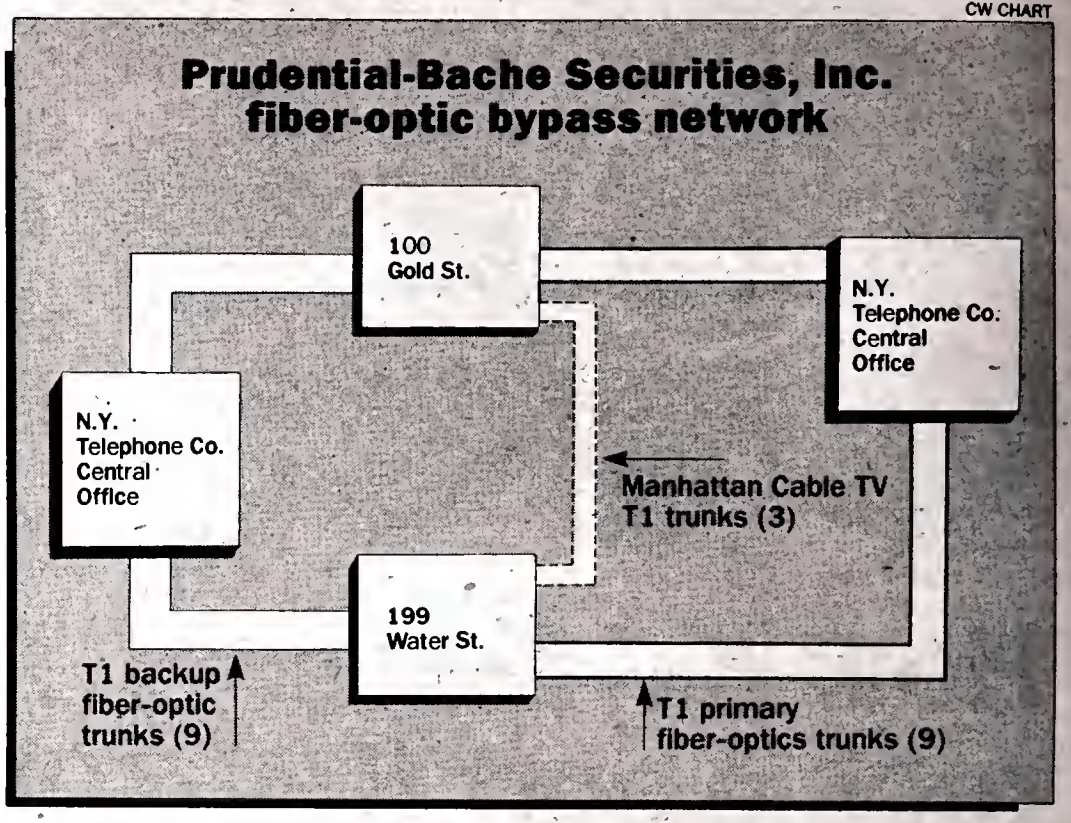
Six months after the project was conceived, designed and approved, the system was complete, Minoli said.

Today, primary and backup fiber-optic cables run between the Gold Street and Water Street complexes through different New York Telephone switch offices, ensuring service even in the event of a switching office failure. For reasons of physical security, the cables enter the respective Prudential-Bache buildings on opposite sides.

The fiber-optic cable has a total capacity of 45M bit/sec., but today the company only uses 12 1.54M bit/sec. T1 links, Minoli said. Other strands of fiber can be brought up by adding terminating equipment.

Because it was initially uncertain how the fiber-optic system would perform, Prudential-Bache contracted Manhattan Cable TV to install three additional T1 links as the system was being installed. These services are provided over tried-and-true CATV coaxial cable facilities and give Prudential-Bache alternate communications routes that further safeguard availability.

CW CHART



Of the 12 T1 links now used, roughly nine carry voice traffic, and three carry data. Voice traffic at headquarters is supported by a Northern Telecom, Inc. SL-1 private branch exchange; the Gold Street facility uses Centrex service provided by New York Telephone. Intracompany voice traffic is provided between the buildings by tying the Water Street SL-1 to a switching module dedicated to the task at Gold Street. The PBX and switching module — which directly interface with the digital bypass links — partition the T1 trunks into 24 64K bit/sec. telephony standard channels.

For data communications over the fiber-optic network, Prudential-Bache terminates the bypass trunks with channel banks from Rockwell International Corp. that divide the T1 capacity into 24 circuits similar to analog leased lines.

The Manhattan Cable TV bypass link used for data communications (the other two are used for voice) is terminated using multiplexer equipment from Datatel, Inc. of Cherry Hill, N.J. This hardware derives 96 9.6K bit/sec. channels out of the 1.54M bit/sec. T1 link. Minoli said T1 multiplexers provide the most cost-effective use of the T1 facilities and that the company is considering using them with the fiber plant as well.

When the cost of the fiber-optic and coaxial transport systems is compared with the New York Telephone leased-line services that otherwise would have been needed, savings range from 60% to 80%, Minoli said. Copper leased facilities for the application would have cost roughly $100/circuit/mo. The T1 bypass systems cost roughly $40 per equivalent channel per month — including lease of the facilities and amortized equipment costs — and as little as $17/channel/mo when T1 multiplexers are used, Minoli said.

But immediate savings are not the only benefit of the system; equally important are advanced data communications capabilities and protection from rate hikes (see related story left). Minoli anticipates that most future rate hikes will concern the local loop. "Having put the local loops on fiber [under a 60-month lease], I believe that we will be insulated from local rate hikes."

Although leasing the facilities means Prudential-Bache must carry a yearly recurring charge, it has enabled the company to sidestep the high initial cost of installing its own system and puts the onus on New York Telephone to maintain reliability.

"Because of divestiture and the dynamic nature of the industry, you are actually able to cut costs while increasing functionality if you do it right," Minoli concluded.

AVOID
DOWNTIME, EQUIPMENT DAMAGE, $ LOSS!

DETECT SURFACE WATER LEAKAGE —

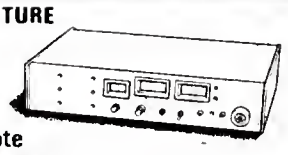
WATER ALERT™ Surface Water Sensing Alarm Systems



- Produces a loud, intermittent alarm when activated by water
- Early water detection (1/64" water film activates) provides maximum time for corrective action
- 9 Water Alert models, both self-contained and remote powered
- 6 & 12 channel Remote Annunciators

DETECT TEMPERATURE SHIFTS —

RTS-600 Six Point Remote Temperature Scanner



- Display and trip preset to °F (0-199) or °C (0-100)
- AC line operated, rechargeable battery back-up
- Over or under temperature trip - relay and logic output
- Ambient or surface mount sensor - standard wiring to sensors

COMPUTER ROOMS, DATA CENTERS, EQUIPMENT ROOMS, MEDICAL LABORATORIES, PUBLIC UTILITIES, PROPERTY MANAGEMENT

CALL OR WRITE FOR COMPLETE INFORMATION

Dorlen Products
Division of Electro-Consultants, Inc
7424 W. Layton Ave.
Milwaukee, WI 53220
(414) 282-4840

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (6 issues), October (5 issues), November (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Copyright 1985 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

ISSN 0010-4841/85 $3.00 + $.50. $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

ABC ABP mcc MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

Adapso, MMA remain at odds over antipiracy issue

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Contrary to claims made last week by members of a software vendors association, the conflict between the association and a corporate microcomputer users group over antipiracy proposals continues unabated.

At a meeting here, members of the Association of Data Processing Service Organization's (Adapso) software protection committee said there has been an easing of tensions between it and the Microcomputer Managers Association (MMA).

But the New York-based MMA, which claims to have spent more than $100 million on micro software last year, disagreed, labeling Adapso's antipiracy efforts largely a "waste of time."

'Costly inconveniences'

In March, the MMA voted to oppose the software copy protection proposals announced earlier by Adapso [CW, March 11], spearheading user concerns that the proposals would be, according to one MMA member, "legislated and costly inconveniences."

Speaking at an Adapso software protection committee meeting held here recently, Ron Palenski, associate general counsel with Adapso, said that following telephone discussions with Adapso committee members in March, only some relatively minor technical concerns — such as keeping track of software keys on a hardware "key ring" protection device — stood in the way of declaring a philosophical cease-fire between the MMA and Adapso.

The MMA's major concern — that the adoption of protection standards by users would be legislated — was laid to rest during these discussions, Palenski claimed. "The MMA now knows we can't recommend marketing methods to them because of antitrust considerations."

'We're hoping they'll attend'

Palenski also said that Adapso had invited the MMA to a standards review meeting at Adapso this week, and "we're hoping they'll attend."

But MMA President Alan Gross, when reached in New York, said, "There has been absolutely no softening with Adapso on our part." Gross said Adapso was "merely going through the futile exercise" of creating standards that would "never be implemented by large-scale users."

According to Gross, "Adapso is just wasting their time." If the implementation of standards were forced, he explained, large-scale users would vote against them with their purchasing dollars.

Wanted involvement at the beginning

Gross said his organization did not attend last week's Adapso technical review meeting to discuss the proposed standards because "we wanted to be involved at the beginning, not at the middle." The MMA might attend future meetings, however, he added.

"At times we'd like to treat some of these user group issues lightly and keep them at their highest level of abstraction," said Mitchell Kapor, president of Lotus Development Corp., who spoke at the Adapso conference. But, Kapor explained, since user groups represent a significant portion of the community, "we have to get involved."

"Adapso is not stonewalling the MMA or any other users group," Kapor insisted. The committee is very concerned about what users say, but it has no plans to refocus its copyright protection strategy to achieve a rapprochement with MMA or any other disenfranchised users, he said.

> *'[Adapso is] merely going through the futile exercise.'*
>
> — Alan Gross
> Micro Managers Association

Adapso has given MMA many chances for input into Adapso's decision-making process, he added, including invitations to discuss issues with Adapso executives and to join Adapso's committee and technical evaluation groups, but so far, "the MMA has chosen not to become directly involved."

Kapor said he did not think Adapso's aggressive strategy had backfired by alienating the MMA. "If anything, it's speeded up constructive dialogue between our two groups and caused volatile issues to get on the table more quickly," he said.

Dan Fylstra, an Adapso committee member and president of Customer Solutions, Inc., a software consulting firm in Palo Alto, Calif., said that disgruntled MMA members should attend Adapso meetings to understand that technical protection is merely a small part of Adapso's overall educational and legislative goals.

Fylstra said a recent Adapso mailing of 120,000 issue-oriented brochures to corporate decision makers across the U.S. has yielded 5,000 positive responses since January, "so the committee is really taking the MMA reaction in its stride."



Only INNOVATION (not even IBM) supports a STAND ALONE BACKUP program or provides a STAND ALONE program that supports XA mode

WHEN DISASTER STRIKES while your processor is running in XA mode or 370 mode . . .

- SAR automatically determines running mode (XA or 370)
- XA mode support saves critical time in a disaster/recovery mode
- XA mode support makes operator procedure simpler and less error-prone
- XA mode support eliminates the need to maintain an alternate IOCDS to use in 370 mode for SAR

INNOVATION's SAR provides the fastest RECOVERY.

SAR supports dumping of disk volumes, data sets, or tracks when no operating system is available.

STAND ALONE BACKUPS Since you can use the DUMP feature of SAR to backup the volume before the restore, STAND ALONE BACKUPS eliminate the need to keep a spare volume to do restores in case the system pack goes down.

VM USERS SAR backup and restore functions are supported under VM.

FDR — The Fastest DASD Management System...

For Your Free
No Obligation 90 Day Trial

CALL (201) 777-1940, or write:

INNOVATION DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013

RECOVERY

Intel boards push IBM micro memory over 640K

By Kathleen Sullivan
CW West Coast Bureau

HILLSBORO, Ore. — Anticipating the release of memory-intensive applications programs and operating environments, Intel Corp. last week announced a set of circuit boards designed to expand the memory of the IBM Personal Computer family beyond its current 640K-byte memory capacity.

With Intel's Above Board memory boards, an IBM Personal Computer's memory can be expanded to up to 8M bytes, the firm said.

Rich Bader, comanager of the Intel operation that developed the add-on boards, said Above Board uses a new implementation of bank-switched memory architecture in order to provide access to the expanded memory.

Expanded Memory Manager

The boards are said to include Intel's Expanded Memory Manager (EMM) software, which is a DOS driver.

EMM supervises the expanded memory and allows programs such as a random-access memory disk and print spooler to concurrently share the expanded memory with applications programs, the vendor company said.

Existing software packages will not be able to take advantage of Above Board's expanded memory without modification, Bader said.

Two lines introduced

Intel announced two product lines: the Above Board/PC, designed for IBM's Personal Computer and Personal Computer XT, and Above Board/AT for the Personal Computer AT, which the firm said it will offer with a Piggyback Memory board.

In the Above Board/PC line, Intel will offer a 64K-byte board, which can be expanded to 512K bytes, and a 256K-byte board, which can be expanded up to 2M bytes.

Above Board/AT memory boards will include a 128K-byte board, which can be expanded to 512K bytes, and a 512K-byte board, which can be expanded up to 2M bytes.

The Above Board/PC with 64K bytes of memory costs $395; the 256K-byte version costs $595, the company said. The Above Board/AT with 128K bytes of memory costs $595; the 512K-byte version costs $995. An Above Board/AT Piggyback Memory board with 128K bytes of memory costs $295, and a 512K-byte version costs $795, the company said.

More information can be obtained from Intel, 5200 N.E. Elam Young Pkwy., Mail Stop TOC-03, Hillsboro, Ore. 97124.

Will memory 'standard' fly?

After jointly developing a bank-switching technique that gives IBM Personal Computer users direct access to additional memory, Lotus Development Corp. and Intel Corp. last week placed the details in the public domain. The attempt is to make the Lotus/Intel Expanded Memory Specification an industry standard, officials at the firms explained.

Initially, the Lotus/Intel expanded-memory specification will pay off primarily for those two vendors and for the relatively few personal computer users who build giant spreadsheets, industry observers and micro managers agreed.

Richard Strauss, vice-president for products at Corporate Software, Inc. of Waltham, Mass., described the memory scheme as "a Band-Aid solution for someone who has a Personal Computer or [Personal Computer XT] and is running into memory limitations running Lotus."

Only about 10% of Lotus users have made that complaint, and they have the option to buy a Personal Computer AT and use a random-access memory disk, he said.

However, others saw greater needs. "As software is evolving, it's becoming much more memory intensive," said Rich Reed, manager of personal computer administration at Cigna Corp. in Bloomfield, Conn., a beta user of Lotus's Symphony 1.1. "Anything that expands the amount of memory that you can do your work in is a good thing.

"The price of the extended memory is going to be a concern," Reed pointed out. Minor drawbacks also may arise — for one, the micro takes much longer to boot as it checks its memory. Overall, however, "it's certainly a plus," he said.

Down the road, others predicted, the added memory will prove useful for multiapplication environments and for large files downloaded from host machines.

While two industry heavyweights — Lotus and Ashton-Tate — had announced plans to write software for the memory scheme at press time, creating a true standard will require support from many developers, observers said.

"Even though this is supposedly an open spec, it really has been a closed spec until now," said Richard Rabins, president of Alpha Software, Inc. "There's a certain amount of anger" among other software firms. Noting the possibility that conflicting memory-management approaches may arise, he said that "the smart thing to do is to take a wait-and-see attitude."

"If you're going to build a bank-switched standard, this probably is it," said Chris Larsen, MS-DOS product manager at Microsoft Corp. He added that Intel and Lotus also have done a reasonably good job ensuring that the spec is compatible with current and planned MS-DOS operating system software.

But he stated that "it's a short-term solution to solving these memory problems" and other memory management designs could be better.

— Eric Bender

LOTUS from page 1

In addition to the boosted memory capability, which requires add-on boards designed to the new specification, both programs will feature a more efficient memory allocation scheme, Kapor said. They also will support Intel 8087 and 80287 numeric coprocessors.

The revamped 1-2-3's spreadsheet will be compatible with the new Symphony spreadsheet, except for differences in macros and some command-level functions, Kapor said.

Priced at $495, the enhanced 1-2-3 reportedly will feature additional macros, the ability to access MS-DOS without exiting the application, regression analysis and other functions. File translation to and from the current version of 1-2-3 also will be provided.

Customers who purchased 1-2-3 after April 24 will be eligible for a free upgrade, but details of upgrades for current users were not disclosed. The enhanced release will require more than 192K bytes of memory.

Symphony enhancements

Among other enhancements offered by Release 1.1 of Symphony, a Macro Library Manager reportedly will permit users to store macros, numbers, labels and named ranges outside the work sheet.

Available for $695, Release 1.1 also includes a file translation facility for moving Symphony files to 1-2-3. Additionally, the installation, documentation and tutorial reportedly have been redesigned to make Symphony easier to learn.

Release 1.1 of Symphony requires 384K bytes of internal memory and runs on the IBM Personal Computer line, Compaq Computer Corp. systems and the AT&T Model 6300 Personal Computer. Upgrades for current Symphony owners will cost $75.

While Lotus did not announce versions for specific local-area network products, the packages "will provide support for [MS-DOS] 3.1 networks in the form of remote file access and support for printing devices attached to the network," Kapor said.

Micro-mainframe package

Symphony Link, which Lotus President James Manzi called "the backbone of our entire 3270 environment strategy," is a micro-to-mainframe package designed for use with Digital Communications Associates, Inc.'s Irma board.

Priced at $395, the add-on software reportedly provides IBM 3278 Model 9 emulation within the Symphony environment, complete with menus and Help screens. It also gives "the ability to directly capture mainframe screen information into a work sheet," Kapor said.

Symphony Link runs on an IBM Personal Computer, Personal Computer XT or AT with 512K bytes of internal memory.

None of the software was demonstrated at the announcement.

Lotus is headquartered at 55 Cambridge Pkwy., Cambridge, Mass. 02142.

CONNECT at COMM MART '85

The New Conference and Show for Quantity Buyers and Sellers in the Communications Marketplace

Presented by the Communication Networks Show Team

IF YOU'RE A BUYER . . .

Connect with the telecomm OEM industry's top experts and suppliers. Get solid facts and learn about future directions in this turbulent, ever-changing marketplace.

IF YOU'RE A SELLER . . .

Connect with the BOCs, specialized common carriers, large user quantity buyers, LAN installer, and other key prospects.

COMM/MART '85 IS COMING SOON!

Sept.16, 1985 — Full Day Seminars
Sept. 17, 18 — Outstanding Conference Sessions
All 3 Days — Select Exhibitors in Private Showrooms
The Grand Hyatt, New York City

CONFERENCE INFO:

Call 800/225-4698 (in Mass: 617/879-0700)
or Write COMM/MART, Box 880, Framingham, MA 01701

EXHIBITOR/SPONSOR INFO:

Call Hajar Associates at the location nearest you:
Boston: 617/444-3946 Florida: 305/737-9059
Anaheim: 714/540-3554

CAN YOU PASS THE TEST 9 OUT OF 10 VM DATA CENTERS FAIL?

IF NOT, YOU NEED THE VM SOFTWARE SEMINAR.

From your own experience, are the following statements true or false? Be honest!

T	F	
☐	☐	There has never, ever, been a security problem in my organization.
☐	☐	Our accounting system automatically bills for system usage, and no one ever complains about the charges.
☐	☐	We never have sudden crunches in our workload, and we never need more disk space than we have.
☐	☐	Overnight tape backup is quick, easy, and totally error-free.
☐	☐	Running a VM data center isn't half as tough as it's cracked up to be.

If you answered "False" to more than one of the questions at left, you'd better sign up for a free VM Software Seminar right away. It's the quickest, easiest way to find out how to eliminate the major problems of VM data centers—and save time.

AGENDA

8:30 am	Registration/Coffee
9:00 am	Taking Charge of your Data Center
10:15 am	Break
10:30 am	Specific Needs, Specific Solutions
12:00	Complimentary Lunch
1:00-3:00 pm	User Workshop (non-users welcome as well!)

WHAT YOU'LL SEE

Each half-day seminar gives you the inside story on VMCENTER—the only comprehensive utility system designed specifically for the VM environment. You'll also see VMCENTER components covering system security, directory maintenance, resource scheduling and accounting, and disk and tape management. And you'll have a chance to talk with current users in a unique workshop setting.

WHO SHOULD ATTEND

VM data center managers and system programmers, security administrators, capacity managers; VMSI product users and non-users alike.

WHAT IT COSTS

Nothing. Even the lunch is free.

WHO'S THE SPONSOR?

VM Software, Inc. (VMSI)—the leading independent vendor of system software for the VM marketplace.

SEMINAR DATES AND LOCATIONS

Atlanta, GA
May 13

Boston, MA
April 16

Chicago, IL
April 16

Cleveland, OH
April 15

Dallas, TX
May 2

Denver, CO
April 29

Detroit, MI
May 20

Houston, TX
May 1

Los Angeles, CA
May 13

Minneapolis, MN
May 21

Montreal, PQ
April 25

New York, NY
May 7

Philadelphia, PA
May 8

San Francisco, CA
May 15

Somerset, NJ
May 9

St. Louis, MO
April 22

Stamford, CT
April 29

Toronto, ON
May 21

Washington, D.C.
May 3

CALL (703) 821-6886 FOR IMMEDIATE ENROLLMENT

VM SOFTWARE INC.

VM Software, Inc., 2070 Chain Bridge Rd., Suite 355, Vienna, Va. 22180 1-CWX-0485

Arco MIS finds hidden bonus in end-user computing

Chemical firm gets fresh viewpoint on 'dirty' data

By John Desmond
CW Staff

PHILADELPHIA — Soon after Arco Chemical Co. gave its end users access to production data in 1983, an Arco financial reporting manager tried to call maintenance expense data from nationwide Arco plants to his screen.

But John Faulhaber found the data was unavailable, and he wanted to know why. From the inquiry of this management end user with no previous computer experience, Arco's information center manager Carl Weber learned something about his production data. "Faulhaber began to see problems deep down in the data that were always there, but we never knew it," Weber said.

Consultants said this fresh viewpoint on old and sometimes "dirty" production data is an unexpected benefit of end-user computing.

One consultant said that when end users begin gaining access to production data, DP professionals become motivated to police that data. "User departments are in a position to look at the data and say there is a problem," said Nancy Kuivila, end-user support manager for the Computer Task Group, Inc., a Buffalo, N.Y.-based systems development consulting firm.

According to Kenneth G. Rau, a partner in the Woburn, Mass.-based Winchester Consulting Group, as end-user computing grows, "the analyst types, as opposed to the technicians, will be able to get their hands on the data and make changes."

Larry DeBoever, president of Linkware Corp. of Waltham, Mass., a micro-mainframe link vendor, seconded the notion that end-user computing promotes cleaner mainframe data. "You're seeing the first seeds of a trend that will grow over time. This will almost force the opening of a dialogue between the end user and the DP manager," he said.


Kuivila

That dialogue took place at Arco, where Faulhaber and Weber said they arrived at a solution together. Arco uses Information Builders, Inc.'s Focus retrieval tool to make its IBM IMS data base easier for users to access. Arco has nearly 100 end users accessing data from IBM 3081 and 3033 mainframes.

Faulhaber was using Focus to view production data when he made his observation. "Focus enabled Faulhaber to shift his perspective and to take more of a top-level view of the company operations," Weber said. "When he tried to do so, the data was not well structured for that purpose."

Weber said that since the beginning of DP at Arco, the data had been inconsistently structured across Cobol applications, so that each plan listed maintenance expenses in different accounts. The only way to compare plant expenses directly was to write a program to do so — an impractical job. Since Faulhaber made his suggestion, the giant chemical company has changed the structure of data in its dispersed and inconsistent applications so that Faulhaber's query and others like it can be answered.

Both Arco managers said the impact on the company has been extensive. Arco has used the data in applications and analyses to reduce expenses, to cut time-shared processing needs and to improve its mix of clients and products in the marketing area. Weber estimated that the applications have generated tens of millions of dollars in income and cost reductions for Arco. "It all adds up," he said.

By querying the data base to analyze products sold, Arco sales managers can now cut sales efforts on less profitable products and concentrate on those with greater profit margins. Arco now offers discounts based on sales volume to distributors, which obtain a list of customers by size from the data base. Such applications were never tried before because the programming costs could not be justified, and users would have to wait too long for the applications, according to Weber.

Micro links result in mainframe applications enhancements

Since being linked to mainframe data bases with micro-mainframe software, end users at two firms have enhanced mainframe applications with the help of information center professionals.

Fidelity Systems Co., a Boston investment firm, uses Linkware Corp. software to link micro users to an IBM 3033 under VM/CMS. Frank Diasparra, vice-president of systems engineering, and his staff are responsible for overseeing nearly two million shareholder activity accounts. Funds managers must be able to move money from account to account on a real-time basis and track money invested in a variety of accounts, so Diasparra's unit needed access to production data.

Fidelity copies a controlled extract of its production data into a service processor. Users on the micro-mainframe link access the controlled extract rather than live production data. Data is downloaded to IBM Personal Computers running Lotus Development Corp.'s 1-2-3 spreadsheet software to produce graphs and reports. The micro-mainframe link cut the time needed to produce the reports from hours to minutes, Diasparra said.

"The good news was that the users found a way to build effective reporting tools using the personal computers," Diasparra said. But the users soon found they needed new reporting requirements. "They saw the power of the product, and the focus immediately shifted to getting the reports out more quickly."

Working with the information center staff, the users devised more sophisticated Lotus spreadsheet reports, such as cash projections by type of fund. Diasparra said applications are continually revised as users work with the DP professionals.

> *'The good news was that the users found a way to build effective reporting tools using the [micros]'*
>
> **— Frank Diasparra**
> **Fidelity Systems Co.**

End users reaped similar benefits at Philadelphia Life Insurance Co., where information center end users have IBM Personal Computers emulating 3270 terminals linked to the company's IBM 3083 mainframe.

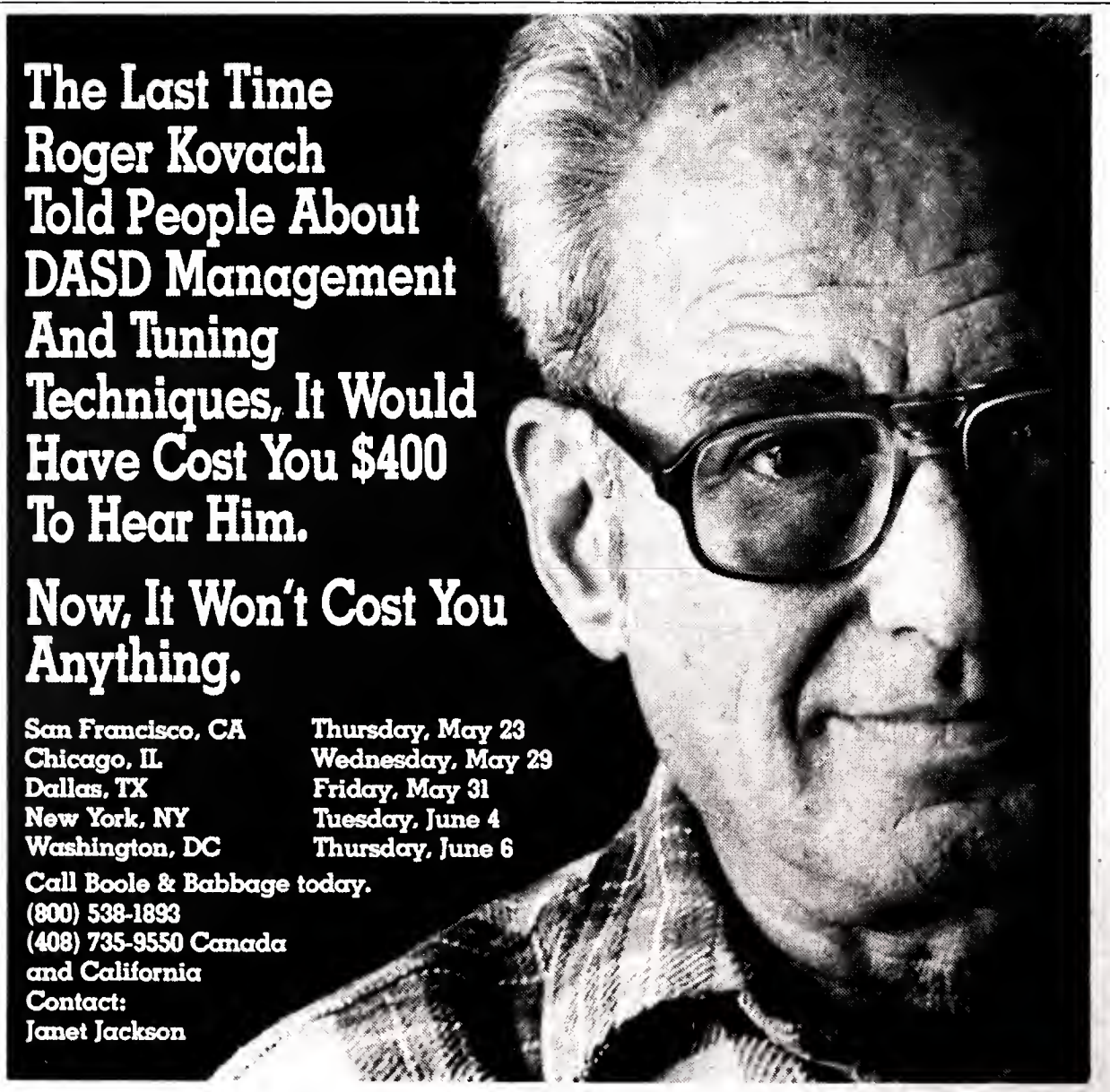
Information center analyst Tom Peterson said that whenever any agent needed mailing labels, the data center would run a batch program to print labels for every agent.

Users came up with the idea of downloading data to micros and printing labels only as needed in a specific state or region. Peterson projects a $40,000 annual savings from the suggestion.

— John Desmond

You can learn a lot about your I/O subsystem by listening to Roger Kovach. The people who've heard his presentations around the world at CMG and Institute for Information Management courses have learned a lot about theirs.

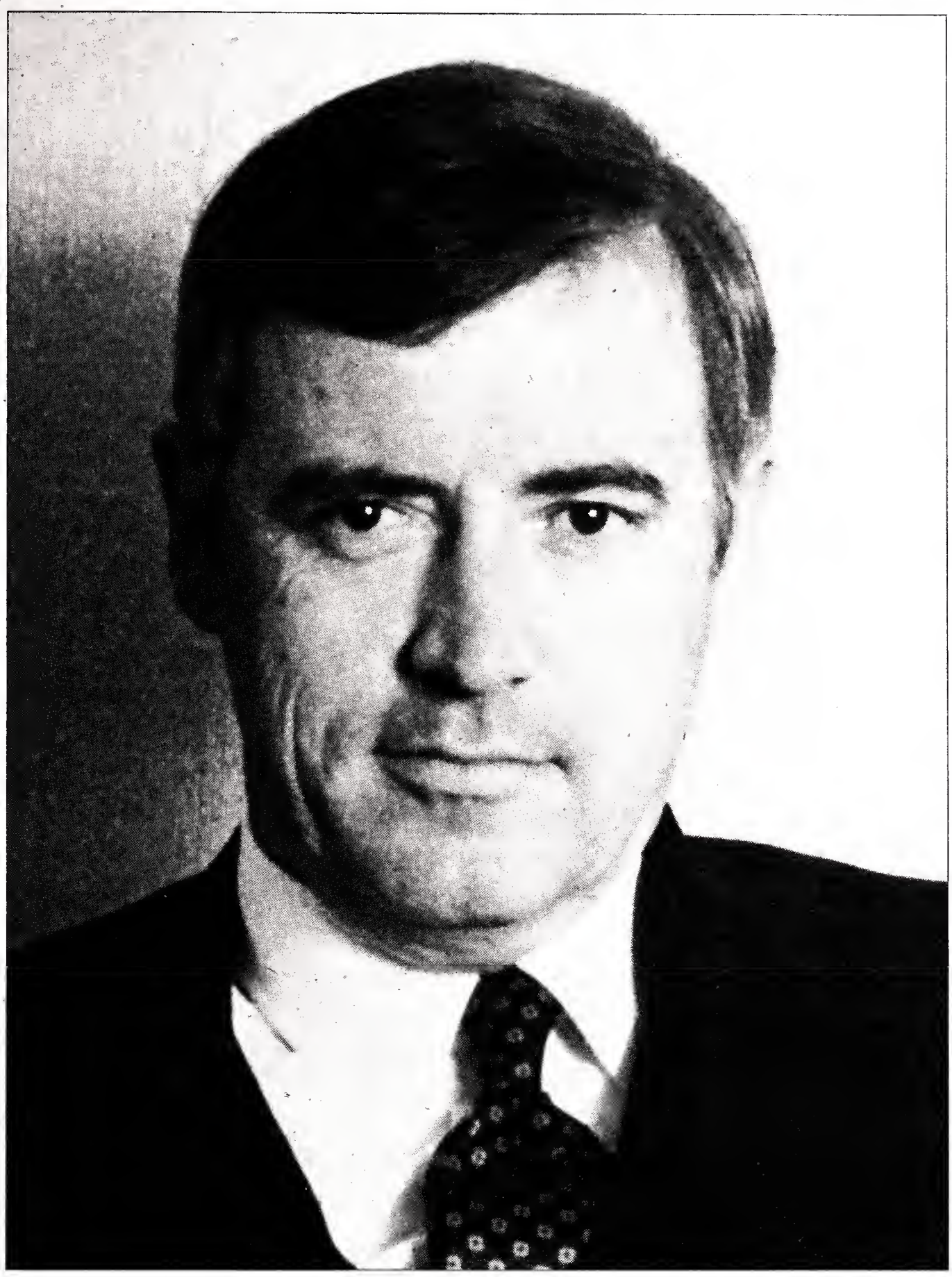
Now, in a series of no-cost, one-day seminars, he'll address several topics including disk drive performance and the effects of DASD configuration, shared DASD, and cache controllers on I/O performance.



Boole & Babbage

JOHN CULLINANE

On the Information Center Strategy

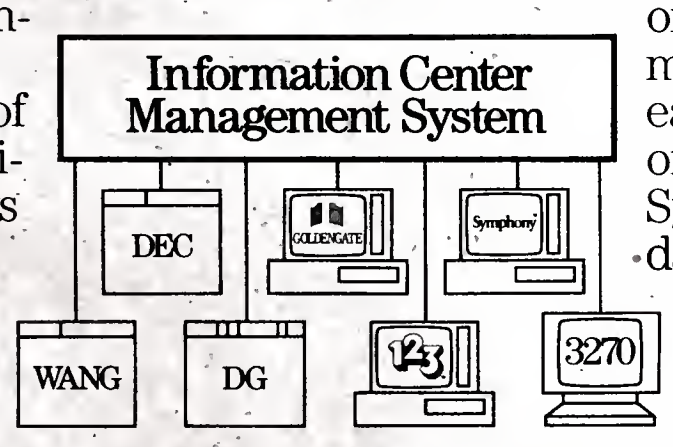


Today, virtually every IBM mainframe user is attempting to implement an information center. Formulating a successful information system strategy for the 80's and 90's requires it.

However, one of the major problems many companies face is the variety of software and databases located on different mainframes, departmental minis and personal computers. The challenge is to create an environment that integrates this diversity, is responsive to the corporate user community in meeting its information needs and, most importantly, provides access that is consistent and transparent. This is why open system architecture is key in implementing an information center strategy.

"Open system architecture is key in implementing an information center strategy."

It also makes particular sense for a software company like Cullinet to adopt a policy of open system architecture that allows corporations to standardize on Cullinet's products without losing a significant investment in other vendors' products—whether they are mainframe applications, microcomputer software such as Lotus 1-2-3, Symphony and other PC products or departmental minis from companies like Digital, Data General, Wang, Hewlett-Packard and others.



That's why Cullinet has introduced the Information Center Management System. It's one part of a strategy that makes it much easier for the VP of Information Systems to standardize on the full range of Cullinet software, including our proven mainframe database and applications and our integrated GOLDENGATE microcomputer software.

Our strategy makes sense not only because Cullinet products are designed to work together, now and in the future; but also because our open system architecture means that data processing management will be able to accommodate satisfied users of other software while anticipating the introduction of new products.

For more information about the Information Center Management System and the full range of Cullinet products, I encourage you to phone, toll-free, 1-800-225-9930. In Massachusetts, the number is 617-329-7700.

IBM, DEC, Wang and DG are registered trademarks of International Business Machines Corporation, Digital Equipment Corporation, Wang Laboratories, Inc., and Data General Corporation respectively. 1-2-3 and Symphony are trademarks of Lotus Development Corporation. GOLDENGATE is a trademark of Cullinet Software, Inc.

Cullinet

© 1985 Cullinet Software, Inc., Westwood, MA 02090-2198

NEWS

IDC from page 1

The survey also reported the following:

■ Large system users are growing faster. Some 10% of 3080 series sites are expected to increase processing power more than 50% per year.

■ The installed base of personal computers at the large-scale processor sites is expected to increase some 60% in 1985.

■ Forty-eight percent of respondents indicated that personal computers will be responsible for increased demand for mainframe power; 39% said the micros will have no effect.

■ Megabytes of installed disk storage will increase 30% in 1985.

■ Users continue to embrace IBM's Systems Network Architecture (SNA) across all CPU sizes in 1984. Some 40% of all 370 architecture sites now support SNA; for 3080-class sites, SNA penetration is 80%.

Larger system users are more likely to be SNA users, the survey found. SNA is used by 80% of 3081 and 3084 users and by 21.1% of 4361 users.

■ Optical storage is up and coming, the survey found. The use of optical storage by 3081 and 3084 users is planned to increase by 22% for new applications.

■ The installed base of 3084 mainframes, first shipped in 1983, will more than double — from 210 in 1984 to 550 in 1985, according to IDC.

IDC projected that from 1984 to 1985, 3081 installations will grow from 1,700 to 1,980; 3083 installations will increase from 1,850 to 2,070; and 3090 installations will reach 200 in the system's first year of scheduled shipping.

The survey showed IBM's MVS/XA strategic operating system is used by 82% of 3084 users, 45.6% of 3081 users and 23.4% of 3083 users.

Increase in upgrades

A strong year for field upgrades was projected by IDC. In the 3083 family, 26.8% of users plan to upgrade in 1985, compared with 24.4% in 1984.

An upgrade from a 3083 to a 3081 is planned by 13.9% of users in 1985, up from 5.6% in 1984. An upgrade from a 3081 to a 3084 is planned by 17.3% of those surveyed, compared with 16.8% in 1984.

The largest percentage of users with plans to increase on-line storage capacity were 3081 and 3084 users. Of those, 48% plan to increase capacity up to 50% over three years. The same mainframe users plan to increase reels in their tape libraries by 60% over three years.

The migration path for disk drives is toward the IBM 3380 and away from the 3330. IDC found a 41% decrease in 3330 installations and a 56% increase in 3380 installations. (The survey predated IBM's announcement of the double-density 3380 drive.) In 1985, IDC projected installations of 12,529 3380 spindles, 9,238 3350 spindles and 1,207 3330 spindles.

Fewer personal computers are stand-alone units, according to the survey. The number of installed personal computers is projected to increase from 30,600 in 1984 to 48,575 in 1985. But the number of installed stand-alone personal computers was projected to decrease from 78% in 1984 to 63% in 1985. Few terminals are dedicated to a single application, and few make use of color or graphics, according to the study. The primary terminal applications reported were inquiry/response, 36.7%, and data entry, 31.7%.

Migration to larger system down

In the 1983 migration survey, IDC found that 22% of users planned to migrate to a larger machine, whereas 28% had such plans in 1981. The current survey shows that 26% of sites will be adding or replacing processors in 1985.

The large-scale systems market grew at an 8.1% rate in 1984, according to IDC. IDC projected a 4% to 5% growth rate in 1985 and a rebound year in 1986 with an 11% to 15% growth.

Describing the contrast between the survey's optimistic outlook and the current industry downturn, an IDC spokesman said, "The reason the mainframe manufacturers are slow is because they're between product cycles, not because there is no demand." A number of new mainframes have been announced in the past several months but have yet to be shipped by their companies, the spokesman noted.

"1985 IBM Migration Survey and Large-Scale Systems Market Data," is available for $795 from IDC, which is located at Five Speen St., Framingham, Mass. 01701.

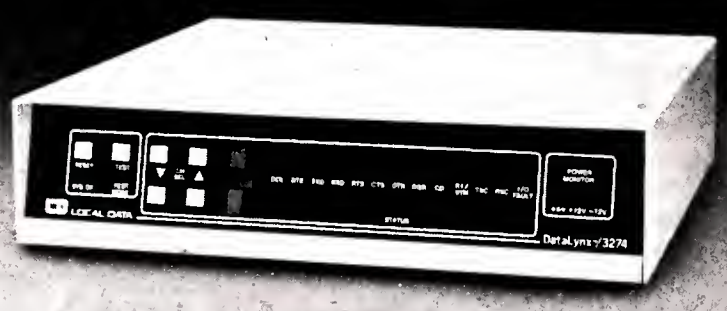
Expected increase in large-scale IBM[1] processing power
(Three-year projections)

Models	Less than 10%	10% to 25%	26% to 50%	50%+	No response
4361 Class	38.6%	36.9%	14.1%	4.2%	6.1%
4381 Class	21.5%	45.8%	23.8%	5.3%	3.7%
3083 Class	10.2%	46.2%	30.4%	11.1%	2.6%
3081, 3084 Class	10.3%	38.3%	35.0%	9.5%	7.4%
All Respondents[2]	22.6%	42.0%	24.0%	6.5%	4.9%

[1] Includes compatible systems
[2] Includes 370, 3030 and compatible systems

Source: IDC

You deserve the best link to IBM . . . DataLynx™ /3274



For several years Local Data has provided AT&T Information Systems, Avis, Bell Labs, Citicorp, Exxon, General Motors, IBM, ITT and other Fortune 500 companies with easy and inexpensive IBM communications using DataLynx™ /3274 . . . the best price/performance 3270 protocol converter available.

Supporting over 50 primary types of terminals and satisfying requirements of more than 125 varieties of ASCII terminals and PC's, DataLynx™ /3274 offers base color support for IBM PC and Viewpoint/78 color terminals, interleaved display/print data over a single dialup connection, pseudo-transparency, graphics data passthru, command port facility, disable echo on ASCII CRT port for computer-computer or X.25, 3270 BSC to 3270 or 5251 SNA field upgradeability and many more additional features than any other 3270 protocol converter.

Call (213) 320-7126 for more information and ask about our free 30-day trial program. In Canada call (613) 748-9751.

"Your Lynx to IBM"

LOCAL DATA

2771 TOLEDO STREET, TORRANCE, CA 90503 TLX 182518

Turns Spaghetti Code COBOL Into Structured COBOL Automatically

SUPERSTRUCTURE takes your unstructured COBOL programs and automatically produces structured COBOL programs that are easy to understand and maintain. SUPERSTRUCTURE provides a simple and cost effective alternative to manually rewriting those unstructured programs that are a maintenance nightmare. Of course you can't believe it. Let us prove SUPERSTRUCTURE works, using your programs at your location. SUPERSTRUCTURE—the breakthrough you've been waiting for. Call today: Marketing Director—SUPERSTRUCTURE.

Group Operations, Incorporated
1110 Vermont Avenue, N.W.
Washington, D.C. 20005
(202) 887-5420

Offices in: Atlanta, Boston, Chicago, Dallas, Hartford, Los Angeles, New York and Toronto.



NEWS

Corona, Televideo, Zenith unwrap IBM AT compatibles

By Edward Warner
CW Staff

The number of IBM Personal Computer AT compatibles doubled last week with announcements by Corona Data Systems, Inc., Zenith Data Systems and Televideo Systems, Inc. of personal computers using the Intel Corp. 80286 microprocessor, the high-speed heart of the AT.

The 80286 chip used in the Televideo AT, however, reportedly operates at 8 MHz, a full 2 MHz faster than the speed of the 80286 chip in the Personal Computer AT and the AT compatibles from Zenith and Corona. A switch in the Televideo AT slows the 80286 chip to 6 MHz to run timing-dependent Personal Computer AT software.

Zenith's Z-200 is said to incorporate "no wait-states" technology, eliminating what John P. Frank, Zenith's marketing vice-president, said were the processing delays built into the Personal Computer AT.

Corona's machine is a 38-lb unit that the company said is the first AT-compatible transportable. The Corona AT Transportable comes with a built-in, 9-in., green-screen monochrome monitor and a color/monochrome video graphics card that reportedly allows it to support an optional color monitor.

Like IBM's Personal Computer AT, the machines reportedly will be offered in standard and enhanced editions, the latter models with 20M-byte hard disks.

Corona's standard machine, the ATP-6-QD, is said to offer one 1.2M-byte drive, one 360K-byte drive, 512K bytes of memory and a price of $4,500. The enhanced version, the ATP-6-Q20, comes with 512K bytes of memory, one 1.2M-byte drive and a $5,500 price tag. Deliveries for both will begin in July.

Corona Data Systems is located at 31324 Via Colinas, Westlake Village, Calif. 91361.

The standard Zenith Z-200, priced at $3,999, reportedly comes with 512K bytes of random-access memory (RAM), expandable to 16M bytes, one 1.2M-byte diskette drive, six AT-compatible expansion slots and Microsoft Corp.'s MS-DOS 3.1. An enhanced version is offered for $5,599.

Zenith Data Systems is located at 1000 Milwaukee Ave., Glenview, Ill. 60025.

The Televideo AT, priced at $3,400 in its standard version, is offered with 256K bytes of memory, a 1.2M-byte diskette drive, a clock/calendar with battery backup, an RS-232 serial port, a parallel printer port and eight bus expansion slots. The enhanced version, priced at $4,995, reportedly comes with 512K bytes of memory. Both machines will ship in July, Televideo said.

Televideo Systems is located at 1170 Morse Ave., Sunnyvale, Calif. 94086.

Televideo claimed another performance advantage over the Personal Computer AT in its use of a special disk controller in the enhanced Televideo AT. That controller has twin buffers that reportedly permit it to read data from one disk track in one pass.

The 20M-byte hard disk in the enhanced version of the Zenith Z-200 reportedly has a 40-msec access time, which is the same as that of the Personal Computer AT.

> *"The Personal Computer AT's processing delays occur because its microprocessor operates faster than its custom 256K-bit RAM chips.*

Zenith's Frank said that the Personal Computer AT's processing delays occur because its microprocessor operates faster than its custom 256K-bit RAM chips. The Zenith machine, he said, uses 256K-bit "fast chips," eliminating the problem and allowing the Z-200 to expand memory in 1.5M-byte blocks. "To get 3M bytes [of RAM], IBM would have to use all of its AT slots," he claimed, adding that the Z-200 can reach 3M bytes with two slots to spare.

All of the AT-compatibles claim to use keyboards offering design advantages over the keyboard of the Personal Computer AT. The Corona machine's keyboard is said to include number and cap lock keys and an interface to the IBM Personal Computer XT. Televideo has placed LEDs directly on the scroll, caps and numeric lock keys, rather than using the Personal Computer AT strategy of placing the LEDs on the keyboard case itself. The frequently used keys of the Z-200's keyboard, meanwhile, have reportedly been enlarged to avoid data entry errors.

All three of the AT-compatibles reportedly will be shown at the Comdex '85 show next month in Atlanta. Personal Computers claiming AT compatibility have already been introduced by ITT, Kaypro Corp. and Texas Instruments, Inc.

SYSTEM 2000
DBMS

The Only Full-Function DBMS for Your Information Center

from the Leader

in Information Center Software

SAS Institute Inc.
First-year Price: $12,000
Call today for a free trial.

SAS®

SAS Institute Inc.
SAS Circle, Box 8000
Cary, NC 27511-8000
Telephone (919) 467-8000 X280

SYSTEM 2000 is the registered trademark of SAS Institute Inc. Copyright © 1985 by SAS Institute Inc. Printed in the USA.

NEWS

Cincom offers Mantis for DEC's VAX, enhances TIS

CW AT INTERACT '85

By Maura McEnaney
CW Staff

CINCINNATI — In a move confirming its belief in the growing importance of departmental systems, Cincom Systems, Inc. last week announced that its Mantis fourth-generation language-based applications development system now runs on Digital Equipment Corp.'s VAX systems.

Cincom also announced an enhanced version of its TIS, including its relational data base management system, that makes the product available to IBM DOS users for the first time.

The announcements were made at Interact '85, Cincom's annual users group meeting at the Hyatt Regency Hotel here.

Formerly available for IBM OS, DOS and CMS environments and Wang Laboratories, Inc.'s VS operating system, Mantis, now out for the VAX, is fully integrated with Cincom's Ultra Interactive DBMS for the VAX environment, according to a Cincom spokesman said.

The DEC version of Mantis incorporates all of the features of Mantis' IBM and Wang versions, including an interactive program development module that allows users to design prototypes, screens, prompts, files, interfaces and programs.

It supports dynamic Mantis files, DEC's RMS files and Cincom's Ultra files. All files can be accessed by Mantis using the same verb commands found in Mantis' data manipulation language.

Mantis for the VAX includes a VAX/VMS full screen editor that allows users to program the Mantis line editor or the VAX editor. Users can access the VAX editor from a programming mode, the spokesman said.

The product also includes a migration utility that lets users move Mantis entities between IBM and VAX environments. The utility performs necessary Ascii and Ebcdic translations, numeric conversions, selected code conversions and record format conversions, the vendor said.

Mantis can be purchased as a stand-alone product or in conjunction with Cincom's Ultra. Pricing is based on configuration and ranges from $16,000 for Mantis on the VAX-11/730 to $89,000 for Mantis and Ultra on the VAX 8600.

Cincom announced that Release 2.0 of TIS data base products, including its relational DBMS, now supports IBM's DOS environment.

Formerly available for IBM MVS, MVS/XA and VS1 operating systems, TIS 2.0 consists of Cincom's Logical User View (LUV), which is said to insulate programmers and end users from physical changes in the DBMS. It includes the In-Line Directory containing information about data base descriptions, data sets, user and logical views; the TIS Relational Data Base Manager; TIS Relational Data Manipulation Language; and the TIS Intelligent Query facility. TIS 2.0 also incorporates Cincom's Mantis fourth-generation language.

Other enhancements to the product include concurrent update protection at the record level and new space management facilities. DBMS enhancements allow users to access standard Vsam files using other Cincom applications tools without having to reload data to data base files, the vendor said.

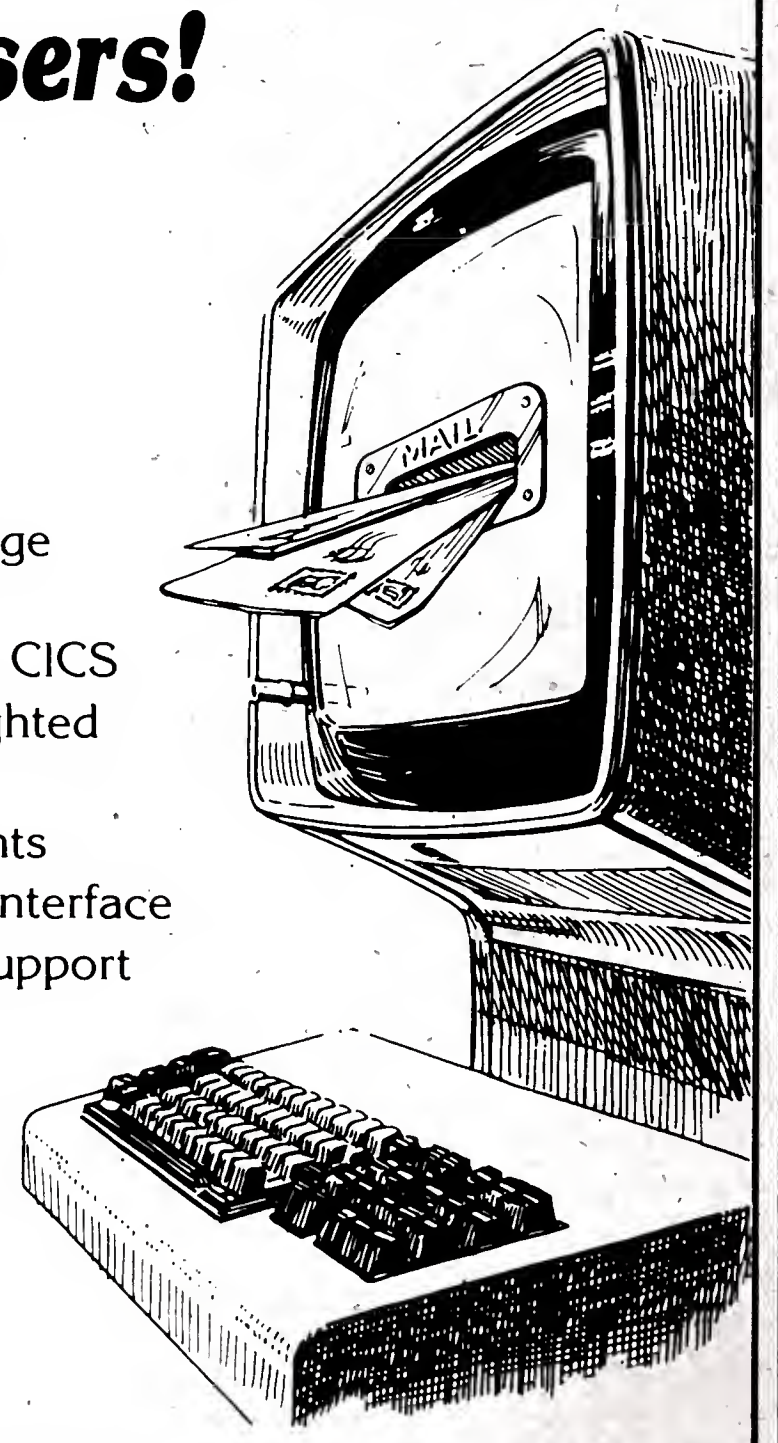
TIS 2.0 is priced between $150,000 and $200,000, depending on options and configurations.

Cincom Systems is located at 2300 Montana Ave., Cincinnati, Ohio. 45211.

SYSM® – Electronic Mail for CICS users!

With New Features:

- Filing
- Calendaring
- Scheduling
- PC Document Exchange
- Electronic Forms
- DOS/VSE, VS1, MVS, CICS
- New Messages Highlighted
- Postdated Messages
- Transfer with Comments
- Application Program Interface
- CRT, Printer & TTY Support
- Tickler Files
- Over 300 Users



For more details on SYSM® call: (208) 377-0336

H&W™ H&W COMPUTER SYSTEMS INTERNATIONAL
P.O. BOX 4785 • BOISE, IDAHO 83711

IBM admits using outdated repair data

By Clinton Wilder
CW Staff

ROANOKE, Va. — In court documents filed here, IBM admitted it used outdated inventory information on repair parts when servicing customers in the South until early 1980. IBM, however, refused to say that the erroneous information resulted in overcharges to its customers.

The admission was included in the company's response to a $600,000 lawsuit filed by a former IBM employee in February in U.S. District Court here. Bobby L. Buck, formerly an IBM customer engineer based in Mobile, Ala., has alleged that IBM adopted his solution to the inventory time-lag problem without crediting or rewarding him.

Buck claimed that IBM's parts locator system at its regional District 6 office in Atlanta ran two to four weeks behind in listing inventories at the district's branch offices. Customer engineers from the branch offices allegedly had to rely on the outdated information in Atlanta to request parts availability for after-hours and weekend service calls.

Buck said most of the allegedly unnecessary cost of shipping parts not tracked by the parts locator was borne by IBM because of the terms of maintenance contracts. Customers without those contracts, however, had to bear the added expense of shipping the part by air from Atlanta, according to Buck's attorneys.

Responding to the allegations, IBM attorney G. H. Gromel Jr. wrote, "IBM admits that prior to sometime in February 1980, its parts locator used by the Atlanta Dispatch Center would be outdated to some degree almost from the time it was prepared."

Gromel wrote that IBM "is without sufficient knowledge or information to form an opinion" on Buck's allegation that shipping costs were passed on to some IBM customers.

NEWS

Wang unveils gateways to IBM office, net products

BRUSSELS — Wang Laboratories, Inc. opened the floodgates last week with the introduction of nine communications products, the most important of which enables documents to be passed between and revised on Wang and IBM systems.

Announced at its executive briefing center in Brussels, the products include the Wang Office/Disoss Gateway, Wang VS Profs Gateway, Wang VS/SNA Gateway, PC SNA 3270 Network, Distributed Management Facility, X.25 General Access Interface, X.3 PAD Emulation Facility, Network Applications Interface and Wangnet Shared Interconnect Modem Service.

The Wang Office/Disoss Gateway reportedly enables editable documents to be passed between Wang and IBM systems with the IBM Distributed Office Support System (Disoss).

Wang gateway

The gateway — which wraps IBM's Document Interchange Architecture protocol around the information to be exchanged — is said to enable users to file, search and retrieve Wang documents in a Disoss library. Access to the function is provided through a menu option on the Wang Office main menu, the company reported.

Available in the first quarter of 1986, the Wang VS and IBM host software components each cost $3,000.

Wang's VS Profs Gateway is said to be an optional feature of the Wang Office, providing VS users with direct access to document libraries within IBM's Professional Office System (Profs).

Document exchange

The gateway performs a number of document exchange functions, including transmitting VS documents to and from specific IBM Profs users and cross-referencing word processing document numbers with Profs document numbers, Wang reported. Additionally, the gateway enables users to determine the status of document processing to maintain user profile records.

The IBM host software for Profs Gateway has a $40,000 license fee, and the VS software costs $2,000. Both are scheduled to be available in the fourth quarter.

The Wang VS/SNA Gateway is said to run on all Wang VS systems, enabling a single VS on a Wang Systems Network (WSN) to act as a network concetrator for Systems Network Architecture (SNA) access. All Wang systems on the WSN can then share SNA resources without requiring each device to have an individual SNA link. The gateway, available in September, costs $1,000 and $600 per link end.

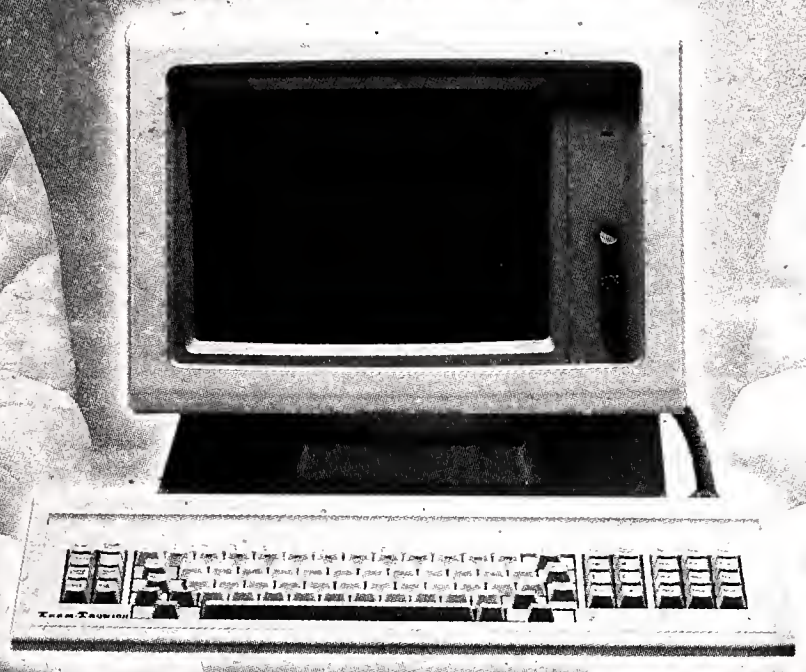
The PC SNA 3270 Network provides a similar function for Wang Professional computers. With the product, a Wang micro on a local network can emulate an IBM 3278 Model 2 workstation and can enable other Wang Professionals on the net to pass through it.

Available in September, the product costs $795 for each 3270 board and $395 for each gateway node board.

Wang's Distribued Management Facility (DMF) is said to enable central site network management for WSN networks and provide the foundation for future Wang management products. DMF functions include logging and report activities, network data base management, control over network components, interactive access to remote system information and administrative functions. Scheduled to be shipped in July, the standard version of DMF costs $1,500. An optional SNA monitor will be available in Septemeber for $1,500; a Wangnet management facility will cost between $17,000 and $24,000 and will be available in September.

Other announcements included the WSN X.25 General Access interface for packet-switched networks supporting the X.25 interface, which will be available in August for $1,000.

An IBM 3178* Plug-To-Plug Compatible Terminal for $995



It's a miracle.

At Term-Tronics, ask and you shall receive.

In fact, you'll receive full compatibility with reliability to go with it!

The MIRACLE-178™ from Term-Tronics is your low-cost 3178 alternative, offering full 3270 plug compatibility with all IBM 3274 and 3276* cluster controllers and integrated terminal adapters on the S/43xx.

The MIRACLE-178™ has many standard features not found in its IBM equivalent, but continues to have the same look and feel.

MIRACLE-178™ Features:

- Multiple style keyboards compatible with IBM's 3178 C2, C3, and C4 layouts to fit your application.
- Low profile keyboard with a cord extendable up to 5 feet to offer you maximum user comfort.
- Compact two-piece design eliminating the logic component to efficiently utilize desk space.
- Tilt and swivel 12 inch monitor with P-39 non-glare green phosphor to provide high resolution display.
- Automatic screen cut-off function to preclude etching.
- Optional separately addressable printer port to turn your ASCII printers into IBM 3287 printers.

For all these functions provided by the MIRACLE-178™ the cost is a mere $995. Put your 3270 Display Terminal needs in our hands.

Don't pray for a miracle, ask us for one.



Masters of Data Communications
Term-Tronics
INCORPORATED

4990 Viewridge Avenue/San Diego, CA 92123
TOLL FREE 1-800-821-8376/In California, (619) 565-6330
Telex 508456

Dealer Inquiries are welcome. *Subject to trademark claims.

YES! I'm interested in a "miracle" in my life.
Please send me more information right way.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Term-Tronics
4990 Viewride Avenue
San Diego, CA 92123

Security pro calls risk analysis reports waste of money

CW AT DP EXPO

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — In a presentation at the 11th Annual Federal DP Expo & Conference here last week, Adolph Cecula made a case for abandoning the government requirement that U.S. agencies prepare formal risk analysis reports on their computer security vulnerabilities.

Cecula, information security administrator for the U.S. Geological Survey (USGS) in Reston, Va., criticized the formal risk analysis approach, which typically uses a mathematical model to calculate the annual cost of possible disasters or security breaches. He said it is very time consuming and expensive, diverts the DP staff from actual risk management and mostly enriches the consultants hired to produce the report.

"I think it's about time we stop wasting money on studies of risk analysis. Instead, spend that money on protecting our information assets," Cecula said.

His paper on the subject received the Hammer Award, presented by computer scientist Carl Hammer, for the best paper at the conference.

Product of guesswork

Cecula said thousands of security professionals have been struggling for 10 years to improve the risk analysis process, without success. Often the calculations are the product of guesswork, he said, because of the difficulty of considering all possible disasters that could befall a computer system or a bevy of micros.

"You're almost pulling numbers out of the air" to plug into the mathematical model, Cecula said, referring to this as "garbage in, garbage out."


Cecula

"After you've done four or five risk analyses, you find that all of your recommendations look the same for similar systems. . . . A formal risk analysis isn't going to tell you anything new," Cecula asserted.

The alternative, he said, is a multifaceted program designed to protect the agency's information assets. At the USGS, a key part of this program is a questionnaire sent to program managers that lists vulnerabilities and then requires managers to state whether they accept a particular risk or are taking action to mitigate it.

"We require people to identify the owners of the computers, the applications, the data bases and the networks. They're held accountable for the protection of those assets," Cecula said.

Minimum security standards, such as off-site backups and documented emergency procedures, are incorporated into manuals distributed to employees, he said.

For systems that need more security than this baseline protection, Cecula said, the USGS uses a structured decision tree process to define security requirements.

Ultimately, the real test of security comes when disasters or hackers strike, he said, adding that "our program has been tested, and it has passed."

He said the USGS has experienced fires, floods, water leakage, disgruntled employees, power problems, unauthorized entry into computer rooms and hackers, but has had virtually no damage to its information assets.

OMB official backs agency's cost review rule

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Office of Management and Budget's (OMB) controversial Circular A-76, a document that requires federal agencies to use private-sector DP services when it is cost-effective, was strongly defended by an OMB official at the 11th Annual Federal DP Expo & Conference last week.

The policy is highly unpopular among the federal DP workers whose jobs are threatened. But David L. Muzio, deputy associate administrator of the OMB's procurement office, maintained that Circular A-76 is a "productivity tool" that encourages federal managers to use innovative methods to provide DP services at lower costs.

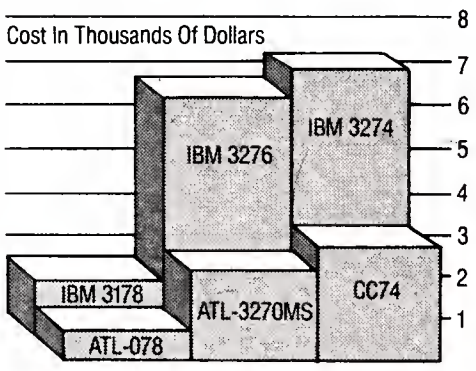
Circular A-76 requires federal agencies to review all their support functions, including DP services, to

See **OMB** page 15

Terminal/System Architecture Of IBM System Building

How Beehive Cuts 3270 System Costs And Boosts Productivity In Less Than 30 Days.

If you're ready to expand your 3270 Network, it's easy. Our ergonomic 3270 product family provides immediate system flexibility with cost effectivity. The ATL 3270MS is an IBM 3178/3278 terminal emulator with an integral 3274 cluster controller that allows the attachment of 4 additional ASCII terminals and 5 ASCII printers. And, up to 8 of these networked devices can be assigned logical addresses.

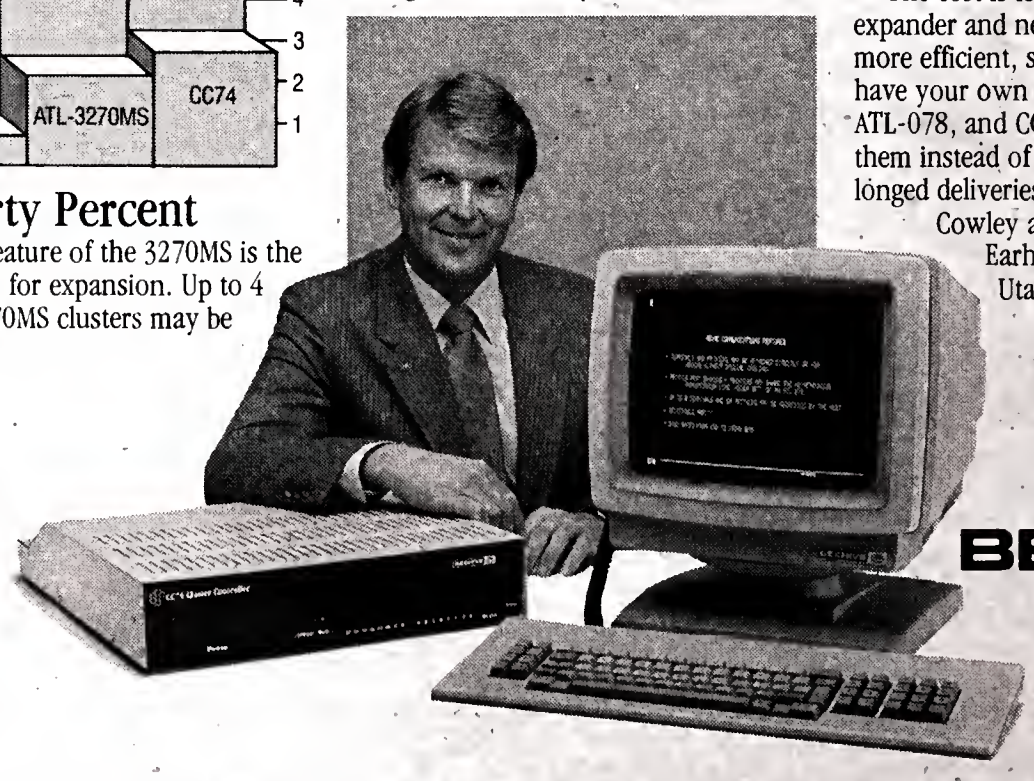


Save Forty Percent

A unique feature of the 3270MS is the true provision for expansion. Up to 4 additional 3270MS clusters may be added, expanding the original 3270MS to 32 logical devices.

Beehive's CC74 is a stand alone Cluster Controller (3274-51C Emulator) that supports up to 8 ASCII terminals with any combination of ASCII printers, for up to 8 logical devices. The 3270MS and CC74 supports SNA and BISYNC and allows the attachment of Beehive's ATL 078 ASCII Terminal (IBM 3178/3278 Emulator), plus ASCII printers and IBM PC's.

A dual-host feature allows attached terminals to work with multiple hosts, and these Beehive terminals can make the switch with a single keystroke! A unique, powerful system, remote clusters, greater economy. For much less.



Finest Ergonomics

It's simple. We take people into consideration. Less eye strain and bigger, sharper characters with Beehive's 14" Eye-Fidelity™ screen. A micro-mesh antiglare filter. Tilt-swivel convenience and DIN spec keyboard. Less noise, with convection cooling that eliminates fan noise, because there isn't one. When a terminal is easier to look at and easy to work with, productivity goes up. Yet the price is down. Way down, and every user has control unit capabilities for the usual price of an IBM display station alone.

Fastest Delivery

The cost is less. It's an IBM system expander and networking team that's more efficient, so why wait! You can have your own Beehive ATL 3270MS, ATL-078, and CC74's when you need them instead of agonizing over prolonged deliveries. Just contact David Cowley at Beehive, 4910 Amelia Earhart Drive, Salt Lake City, Utah 84116-2837.
Toll Free 1-800-453-9454

BEEHIVE™

Sales Offices:
CALIFORNIA Costa Mesa 714/540-8404, Sunnyvale 408/738-1560 • ILLINOIS Arlington Heights 312/593-1565 • MASSACHUSETTS Woburn 617/933-0202 • NEW JERSEY Colonia 201/381-9883
TEXAS Dallas 214/239-3330 • UTAH Salt Lake City 801/355-6000 • WASHINGTON, DC (VA) Falls Church 703/573-1261

NFL drafts superminis to link teams to league office

By John Desmond
CW Staff

NEW YORK — When the National Football League (NFL) draft is held at the Omni Center Hotel here tomorrow, sports reporters nationwide will appreciate the fact that NFL headquarters has added two Digital Equipment Corp. VAX-11/780 superminicomputers in the past year.

For the first time, reporters will be instantly supplied with reports listing which players were selected in each round. Prior to and during the season, the system will generate reports on what players have been cut or placed on injured reserve lists. Statistical analyses for use in subsequent player drafts will be made available once the ongoing VAX installation is complete. The new reports are made possible by more diversified DEC software than that running on the NFL's DEC PDP-11/70, which remains in place.

According to Mary Oliveti, manager of information processing at the NFL, "We're upgrading the types of programs we have and are adding more functionality to them." But the overall aim of the NFL's processor migration is to improve communications within the NFL, not so much with the outside world. The benefit to reporters is a bonus. "Our intent is to connect each club with the main league office and utilize the electronic mail system" of the VAX-11/780s, Oliveti said.

Establishing a link with each club's headquarters will not be a simple task, since many types of hardware are involved. "We chose DEC [equipment for the NFL headquarters] because of its ability to communicate with other hardware," Oliveti said. A decision has yet to be made on whether dial-up or leased lines will be used to link NFL offices, she said.

The NFL decided to wait for Release 4.0 of DEC's VMS operating system to become available before having the VAX-11/780s delivered. Thus, the original timetable of completing the installation by this year's draft was pushed back. The advantage of VMS 4.0 is its ability to take advantage of clustered processors and shared disk drives, according to Oliveti. The league has also purchased DEC's All-In-1 office and information systems software.

The NFL is more than doubling its installed capacity by adding the two VAX-11/780s. The capacity is needed to handle data processing and office automation functions.

The most labor-intensive aspect of the migration has been programming. Oliveti said 500 Cobol programs, written since the league acquired its PDP-11 in 1979, had to be converted for use on the VAXs. As of last week, the task begun in January was 80% complete, she said.

UNLIMITED FREE BEE.



Get A Free Beehive ATL-078 Terminal With Every ATL-3270MS Or CC74 You Order.

Now, Beehive makes it simple to expand your 3270 operating network. We're so convinced you'll appreciate the features and performance of our ATL-078 Eye Fidelity™ terminals that we're cutting the price to zero in order to prove our point.

The dual-personality ATL-078 ASCII terminal emulates the functions, keyboard layout and display format of IBM's 3178/3278 terminals. In its alternate mode, the ATL-078 is a full-function, general purpose ASCII terminal.

The incredibly versatile ATL-3270MS small clustering system integrates a display terminal and four additional ports for ATL-078 displays, printers or PC's. A host-addressable printer can be connected to each display port, creating an efficient, flexible eight-unit cluster. The CC74 eight port cluster controller has the same versatility.

With no quantity limits, Beehive lets *you* set your own level of savings.

You'll get Beehive's larger 14" display with dual dynamic focusing, improved character set, full DIN-spec keyboard, 24 programmable function keys, 3 program attention keys, and two I/O ports.

Don't let this opportunity pass you by! Clip and save with the economy size coupon or, if you're really in a hurry, use our toll free number. Whatever you do, do it before July 31, 1985 or the FREE BEE deal is over.

OK, Beehive, make me a hero! Your ATL-078 offer is what I've been looking for.

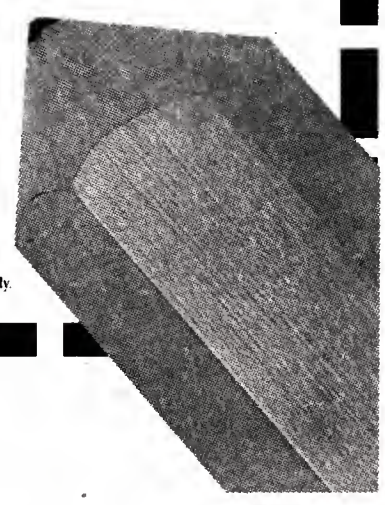
☐ Have a Beehive sales representative call me for an appointment.

☐ Send me information on Beehive's full line of Eye Fidelity™ equipment.

Name_____
Title_____
Dept._____ Mail Stop_____
Company_____
Address_____
City, State, Zip_____
Telephone_____

BEEHIVE™

Offer available in Continental U.S. and Canada only.



800-453-9454

OMB from page 14

determine if it would be more cost-effective to have them done in-house or by contracting out to private firms. The Reagan administration has given high priority to the program and identified data processing as a major target.

Muzio addressed a conference session called "Private Sector DP Services: Solution or Headache?" — a title he said he disliked.

'A productivity tool'

If federal DP managers can bring their costs down to the level of private-sector DP service vendors, Muzio explained, they can avoid contracting out. "[The] OMB has been unable to communicate to the federal work force that A-76 is not contracting out, but is a productivity tool," he said.

According to Muzio, Circular A-76 puts federal DP managers in competition with the private sector to provide computer services to their clients. He said federal managers are capable of meeting the competitive challenge if they discard old ways of operating and try innovative approaches.

"They ought to be able to win most of the [Circular A-76] reviews," Muzio said.

He added that 49% of the A-76 reviews are now won by federal workers, compared with 40% several years ago.

'Taxpayer deserves that break'

Muzio did not specify what innovative steps DP managers could take to compete with private vendors, but he noted that government offices generally must reduce their staffs and salaries to be competitive. "We think the taxpayer deserves that break," he said.

Paula R. Ewen, a computer specialist at the U.S. Department of Transportation, said she conducted two A-76 reviews, and in both cases, the DP services were contracted out. In one case, 32 government jobs were cut and $548,000 was saved in a three-year period.

In the other case, Ewen said, 80 government jobs were cut and $2.2 million was saved in a four-year period.

She urged federal managers to get employees excited about competing with the private sector in order to encourage innovative ideas about providing better DP services at lower costs.

Manufacturing firm puts wrap on report distribution

By Donna Raimondi
CW Staff

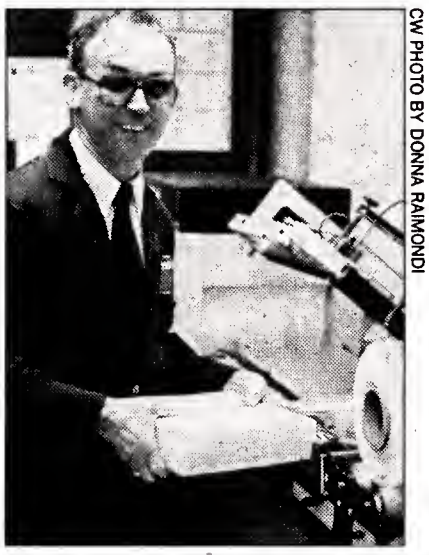
FRAMINGHAM, Mass. — A supermarket meat-wrapping machine inspired the solution to report distribution problems in a company here recently.

The Dennison Manufacturing Co. had rejuvenated its report distribution process during the past few months but had not come up with the final bit of the distribution puzzle, said Gary Kelley, manager of user services at Dennison Manufacturing here — not, that is, until Kelley took a walk through a supermarket.

Dennison produced five million custom forms and used 12.8 million sheets of stock computer paper for reports in 1984, Kelley said. In addition, 1.5 million sheets of paper were printed on an outside service bureau's laser printer at a cost of $34,000 per year, he said. "You could loop the paper we used in one day over Mt. Everest," he said.

Two IBM 3203 Model 5 impact printers (technology circa 1965) produced reports at Dennison's main office that then had to be separated, addressed and distributed to Dennison divisions around the country, Kelley said. "We wanted to be able to print at remote locations, such as Crossville, Tenn., where we have a plant," he said, and overnight deliveries were insufficient.

The company had installed a batch report distribution system that was not meeting its needs when it



CW PHOTO BY DONNA RAIMONDI

Shrink-wrap operation

heard about a software package called VS Dispatch, developed by Value Software, Inc. of Cherry Hill, N.J. The on-line software allowed Dennison to distribute reports to many different plants at the same time for printing at remote locations, Kelley said.

VS Dispatch, which costs $32,000, continually looks at the MVS operating system and the JES2 print queue for any jobs of a particular classification and it builds bundles according to mail drop location, he said.

Before the new system, if user A and user B wanted different portions of a report but had some overlap in what they needed, the report would be printed on two-part paper, separated and distributed, Kelley said. "We threw away 22 30-gal. drums of paper a day in waste," he said. The manual labor was heavy and error prone, he said.

The new system directs the printer to print only what is needed for each person, Kelley said. It prints the user name and location in bold letters on the report, he added.

If a user calls and wants to know where his report is, Kelley can find out where in the print process it is, he said, by logging on and looking the file up on line.

When reports are finished, they are automatically archived onto tape, which Kelley keeps for a month, he said. Dennison has saved $86,000 in rerunning costs because of the archiving system, he said. "If somebody spills coffee on his report, loses it in the mail or just wants an additional copy, we pull it in from tape and print it again," he said.

After solving that part of the report generation problem, Kelley looked at the printers themselves and decided that they were inadequate. He called in IBM, who told him that his company did not have enough volume to justify bringing in the IBM laser printer, he said. He also could not justify $244,000 for a Xerox Corp. laser printer, he said, but he looked around and found a Royal Business Machines, Inc. Royal 8800 ion deposition printer (which is a Delphax Systems S6000 printer) that would meet his needs and costs $82,000.

The company installed the 60 page/min, cut-sheet printer and uses three-hole copier paper in it, Kelley said. The machine, based on a cold fusion ion deposition process in which chemicals instead of heat are used to bond toner onto pages, requires no special air-conditioning and sits out in a hall, he said.

When report generation and printing were taken care of, Kelley thought it was silly that people were still stuffing the already-addressed reports into envelopes and readdressing them, he said. He mulled the problem over without finding a proper solution, he said, until he went shopping in a supermarket one day and saw a meat wrapping machine in action. "I had no idea what the cost would be or if it would be worth it," he said, but he made calls and discovered he could get a shrink-wrap machine from Beseler Corp. of Florham Park, N.J., for $4,000.

Now when the reports come off the printer, a staff member puts a piece of cardboard behind the report and runs it through the shrink wrapper, he said. Users have been sending him notes telling him how much they like the new system, he said.

"We haven't put everything on it yet because we've only had it since September," Kelley said. Manufacturing reports, source data collection data, on-line order entry and internal MIS reports are on-line now, and by the end of the year Kelley hopes to have everything else on the system, he said. The 24 copies of the general ledger reports will be cut down to 12 copies when it goes on the system, he said.

HIGH SPEED DATA ENTRY using the IBM-PC

DATAFLOW

*Powerful * Comprehensive * Professional * Friendly * Proven*

A software package which allows very high-speed key entry and key verify on the standard IBM-PC with 256K and dual disk

DATAFLOW operates in the spirit of the IBM 5285, 3741 and 129 using simple format and prompt records which are easily created by the operator

DATAFLOW is a proper solution for today and tomorrow

- data file compatibility with MS-COBOL
- file conversion utility provides plain files for transfer to mainframe
- easy creation of format and prompt records
- prompt loads automatically with preceeding format
- up to 9 formats and related prompts in memory at once
- easy save and load of format/prompt group for a job
- automatic or manual selection of format and prompt
- linking of formats
- forward and backward scrolling of data records
- while keying, the two previous records are displayed
- while verifying, the previous and next records are displayed
- the data record on the screen is delimited according to the format
- record change in update mode by driving cursor around the screen
- search on mask
- global search and replace
- go to record number
- protection against power failure
- associated utilities included
- and more

Shipment within three days via priority mail License fee is $600 for use on one PC and $200 for each additional For more information send $25 for owners manual Send purchase order or your check and mailing address to

National Data Processing Corp.
716 South 17th Street
P O Box 3393, Wilmington, NC 28406

919-763-1559
763-9616

GOOD COMPUTER STUFF SOME NEW— SOME USED MasterCard VISA CHEAP!!!

DEC

LA12A	USED	$1000
LA120AA	USED	1250
LS120	USED	699
LA34DA w/Tractor	USED	295
LA100AA	USED	1250
LA100PC	NEW	1045
VT52	NEW	595
PC100 w/Monitor, Keyboard OP/SYS	DEMO	2000
PC100B w/Monitor, Keyboard OP/SYS	DEMO	2400

CORONA PC's–All New

PCHD2 w/Monitor	$2100
PC400 Monitors	160
Mega PC w/Work St.	4579
PC4HD2 PC400 w/10MB, 256K	2711
PPC22-portable, 256K	1500
PPCXT-portable, 10MB	2311

Digital Engineering

VT640	DEMO	$1000
DQ640M/640M00	NEW	885
DQ650M	NEW	1150
RG1000	NEW	495
RTGX-12	NEW	75
LS3A/5	NEW	265
TV60, TV63	NEW	275

Printer interfaces & CA also avail.

TeleVideo

TS1603-16 bit CP/M	NEW	$1500
TS802	DEMO	1500
TS802H 5MB	DEMO	1500
TPCI 8-bit, 2-drive	NEW	1200
910	USED	199
910+	USED	420
914	NEW	449
925	NEW	550
925	USED	495
912B	NEW	350
970	NEW	881
970	USED	749
GE 2120 KSR	USED	825
Datamedia Colorscan Low Res.	DEMO	1195

Lear Siegler

ADM 3A+	USED	$ 240
ADM 3A	USED	145
ADM 5	USED	326
ADM 11	NEW	439
ADM 12	NEW	565
ADM 21	NEW	558
ADM 36	USED	585
ADM 36 Gr. 15"	USED	625
ADM 220	NEW	549
Versa Print 520	NEW	1468

OKIDATA

MIC 80	USED	$ 115
MIC 82A	NEW	286
	USED	215
MIC 83A	USED	250
MIC 84S	USED	475
2350S	NEW	1747

DIABLO

630RO (Not API)	USED	$ 995
620SPI	DEMO	768
1640	USED	695
1650	USED	795
F33	NEW	1110

Texas Instruments

810PK	USED	$ 790
765	USED	200
785	USED	775

CODEX-All New

19600 w/mux	$2080
19605	1650
48150 ASY LDSU	218
48350 SYN LDSU	488
60110 4 ch. mux	1110
60112 4 ch. mux	2095
60120 8 ch. mux	1710

WYSE–All New

WY50	$ 463
WY75	587

RACAL-VADIC

103MA/MB	USED	$ 50
3413/3451	USED	245
3455	USED	195

ANDERSON JACOBSON

1234	USED	$ 195
	DEMO	545
1234/1255	USED	235
1259	USED	295
	DEMO	399
1233	USED	350
CDI 1203	USED	449

Quantities Limited
30 Days Warrranty on Used Gear

NATIONAL COMPUTER Communications Corp.
Ask for Becky or Eileen
260 West Ave.
Stamford, CT 06902
call: 800-243-9006
in CT 203-357-0004

AMA plans conference

SAN FRANCISCO — An American Management Association (AMA) seminar — "Long-Range Information Systems Planning" — will be held at the Ramada Renaissance here June 3-5. The seminar is geared toward vice-presidents and directors of management information systems and DP and executive teams involved in planning information systems.

The seminar, which will also be held at the Back Bay Hilton in Boston on June 17-19, consists of courses in information systems planning, planning techniques and planning documents.

The registration fee is $775 for AMA members, $890 for nonmembers. Team fees are available. More information is available from the AMA, P.O. Box 319, Saranac Lake, N. Y. 12983.

NEWS

Panel asks: What information should MIS produce?

By Charles Babcock
CW New York Bureau

NEW YORK — Jack E. Schang, chairman of Ryder/PIE Nationwide, said that when his company has a big problem to solve, he tries not to call on MIS.

"If [MIS] gets involved, it will take too long," he explained to business and MIS executives at the two-day seminar, "New Opportunities in Management Information," organized by the Conference Board, a business advisory research group.

"That's a terrible thing to say because I'm supposed to be leading them," added Schang, one of four seminar speakers.

Nevertheless, his comment prompted seminar attendees to question what information MIS should be trying to provide and how quickly.

Irma M. Wyman, vice-president of corporate information management at Honeywell, Inc., said the Internal Revenue Service and Big Eight accounting firms — rather than a business' top executives — have tended to frame the definitions of what information will be available.

'Certifiable antiques'

She called general ledger and other basic business software "certifiable antiques" but said MIS directors run into protests from operating unit managers if they try to implement change.

She charged that the assumptions behind the business are not available as components in these systems, and they rarely offer the opportunity to pose "what-if" questions. "None of these systems was designed to analyze the organization as a whole," she said.

Two other speakers said MIS managers could resolve the dilemma described by Schang and Wyman by redefining the way they look at information.

Because business conditions can change so quickly, MIS needs to pay more attention to external information as well as internal data, noted Jay W. Lorsch, a human relations professor at the Harvard University Business School.

Lorsch said oil company MIS departments were still struggling to provide information on moving oil supplies to market when their top managers had an oversupply on their hands.

Profitability for a company and its competitor needs to be reported, Lorsch said. Traditional market-share data must include information on whether overall markets are expanding or contracting, he said.

MIS also needs to try to quantify internal information that has been supplied by intuition in the past, he continued.

One of the biggest needs is for "systematic information on how top management is doing; some people are good at growing the business, some are good at squeezing and cost cutting," Lorsch said.

To provide this type of information, the MIS manager needs to stop being a technologist concerned with running data-handling machines and become a chief information officer, said Fenwicke W. Holmes, president of the International Academy at Santa Barbara, Calif., a nonprofit institute studying the transition to an information society.

A chief information officer would be able to integrate into reports external data and text explaining what that data means, because the officer would understand the underlying principles of the business, Holmes said.

The officer would be in close communication with top management and understand what information it needed rather than supplying data based on past practice. The officer would participate in strategy planning and "be perceived as being of vice-presidential caliber," Holmes said.

MIS is becoming "the central nervous system" of a business, but too few corporate executives see it that way, Schang said. In some instances, the "vending machine" approach to MIS prevails, Wyman added. "Push the buttons, and if it doesn't deliver, kick it."

Software AG users meet set

NASHVILLE — Software Jamboree, the 14th annual international user's conference, will be held May 19-23 at the Opryland Hotel here.

The conference will feature tutorials and classes on a variety of information management software products from the conference sponsor, Software AG Systems, Inc. Instructors will discuss technical issues relating to vendor products including the Adabas, Natural and Com-Plete software series.

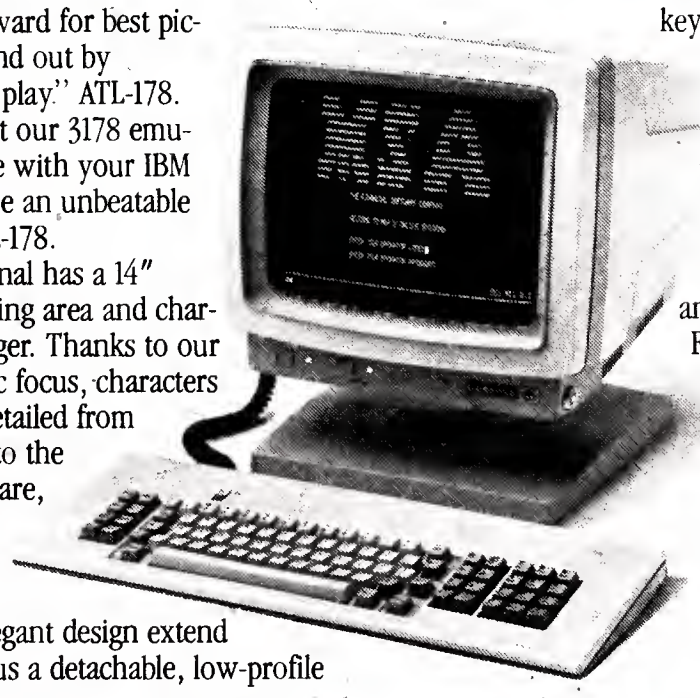
The keynote speaker is NBC News correspondent Edwin Newman. The guest speaker is Carma McClure, software consultant and coauthor of four books on major structured technologies.

Registration fee for the conference is $595. More information is available from Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091.

Terminal/System Architecture in Data Processing

$1095.00 With Printer Port
Base Price Quantity 1

Beehive Challenges You To Take The 3178 Screen Test



Who will win your award for best picture—IBM or Beehive? Find out by screening our "plug and play" ATL-178. You'll see right away that our 3178 emulator is totally compatible with your IBM equipment. You'll also see an unbeatable display on Beehive's ATL-178.

Why? First, our terminal has a 14" screen, not just 12". Viewing area and characters are some 17% larger. Thanks to our proprietary dual dynamic focus, characters are crisp and precisely detailed from the center of the screen to the very corners. Our anti-glare, micro-mesh filter screen further enhances your viewing pleasure.

Ergonomics of our elegant design extend to tilt/swivel features, plus a detachable, low-profile keyboard. As you'd expect, we're 100% compatible with IBM in function and interface, side-stepping retraining and installation woes.

Beehive ATL-178 is available for immediate delivery in your choice of green and amber screens, with keyboard options like IBM's C2, C3 and C4. And for $470.00 less per copy! For details–for your own personal showing–contact: David Cowley at Beehive, 4910 Amelia Earhart Drive, Salt Lake City, Utah, 84116-2837.

Toll Free: 1-800-453-9454

BEEHIVE™

Sales Offices:
CALIFORNIA Costa Mesa 714/540-8404, Sunnyvale 408/738-1560 • ILLINOIS Arlington Heights 312/593-1565 • MASSACHUSETTS Woburn 617/933-0202 • NEW JERSEY Colonia 201/381-9883
TEXAS Dallas 214/239-3330 • UTAH Salt Lake City 801/355-6000 • WASHINGTON, DC (VA) Falls Church 703/573-1261

NEWS

WASHINGTON UPDATE
Bryan Wilkins
CW Washington Bureau

Bill allows federal agencies to enter multiyear contracts

WASHINGTON, D.C. — U.S. Sen. William S. Cohen (R-Maine) recently introduced legislation that would allow civilian U.S. agencies to enter multiyear contracts for DP equipment and services and therefore take advantage of the price discounts offered with long-term contracts.

Civilian agencies now are restricted to one-year contracts, coinciding with the annual congressional appropriations.

Cohen said the bill (S. 678) permits an agency to enter a multiyear contract if there is a "reasonable expectation" that additional funding will be forthcoming and if a long-term contract benefits the government.

When customers commit to long-term leases, Cohen said, some DP vendors provide discounts ranging from 62% to 75% of the one-year lease rate.

He said a government study found that customers (such as the government) who are restricted to one-year leases have paid as much in two years as other customers pay in five years.

The bill was referred to the Senate Committee on Governmental Affairs. Last year, the U.S. Senate passed the bill by unanimous vote, but it was not enacted by the U.S. House of Representatives.

GSA program to require triennial DP office reviews

WASHINGTON, D.C. — The U.S. General Services Administration (GSA) has established the Federal Information Resources Management Review Program, which requires federal agencies to conduct triennial reviews of their information systems and activities.

As required by the Paperwork Reduction Act of 1980, the reviews will be conducted by each federal agency, supplemented by GSA evaluations, and then submitted to the Office of Management and Budget and to Congress.

The objective is to "determine if each agency is carrying out its information management activities in an efficient, effective and economical manner in support of program missions and objectives," the GSA program regulation said.

U.S. privacy policy board proposed by House bill

WASHINGTON, D.C. — A bill to create a permanent U.S. privacy board to oversee domestic and international privacy policy was recently introduced by U.S. Rep. Glenn English (D-Okla.), chairman of the House Subcommittee on Government Information, Justice and Agriculture.

English said the bill (H.R. 1721) would establish a Data Protection Board as an independent federal agency with 30 employees. Domestically, the board would oversee the government's compliance with the Privacy Act of 1974 and help develop data-protection standards for private industry.

The congressman complained that privacy issues have been neglected by the U.S. Office of Management and Budget and by the National Telecommunications and Information Administration.

In international affairs, the proposed privacy board would help U.S. companies comply with foreign laws, coordinate U.S. policies with those of other nations and consult with foreign data-protection officials. English noted that Austria, Canada, West Germany, France, Norway, Sweden and the UK have established data-protection agencies.

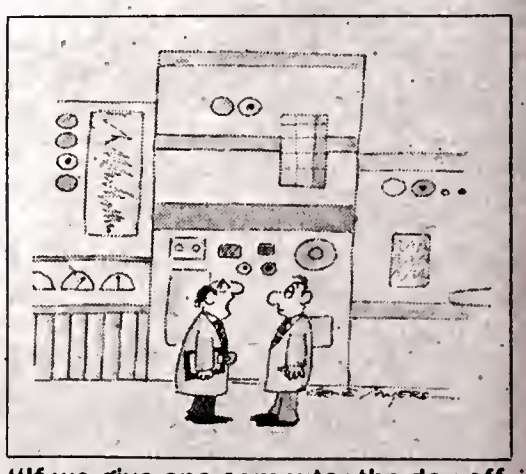
Army to offer guidelines on information center setup

WASHINGTON, D.C. — The U.S. Army's computer research institute is developing guidelines for Army offices to use when starting information centers, Maj. Terry Hilderbrand told the Association of Federal Computer Users last week.

He said the guidelines will outline policy choices about how an information center will be funded, organized and staffed and what functional roles it will play in end-user training, product evaluations, microcomputer standards and consultations.

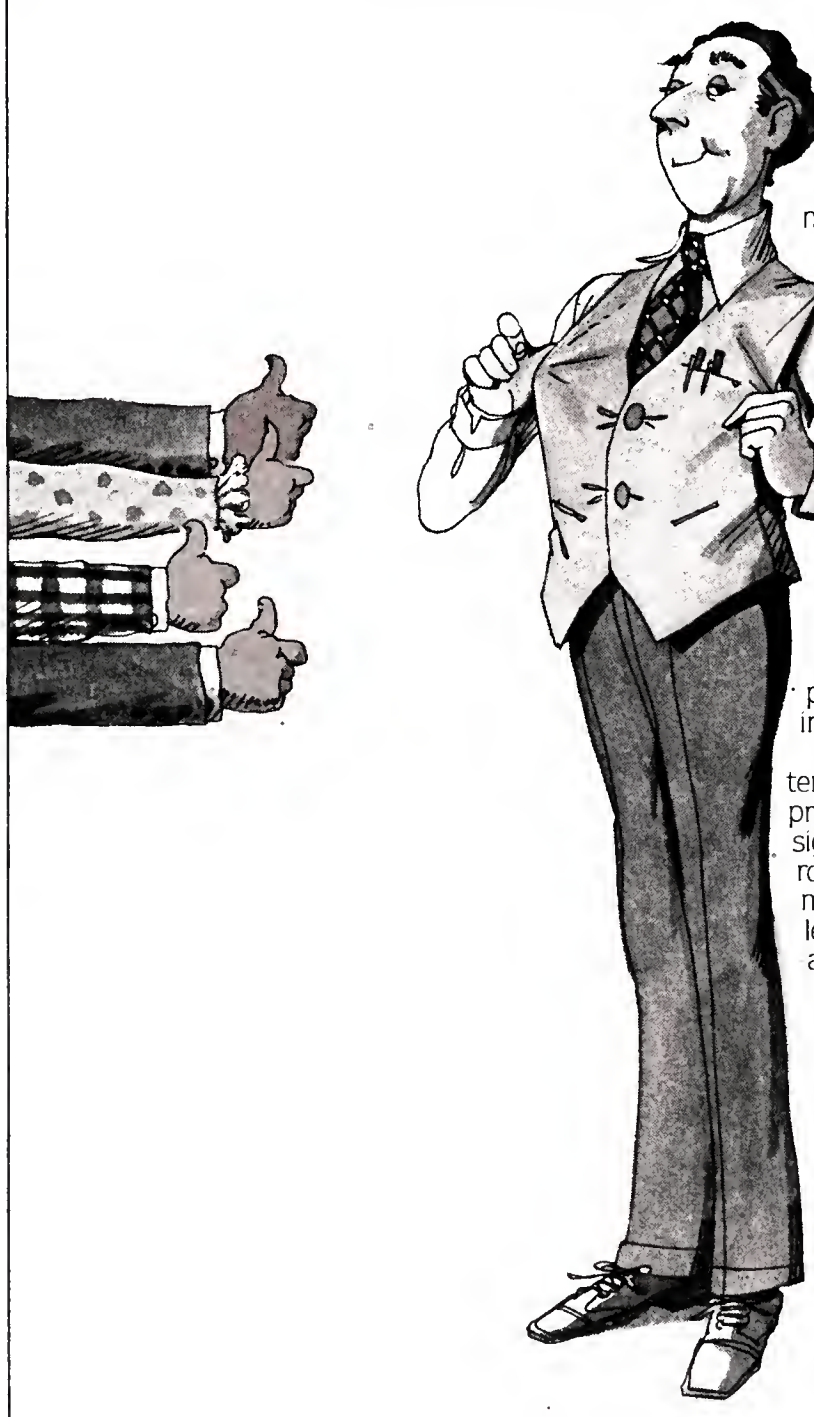
Hilderbrand said the document, available in about 12 months, will be based on empirical research being conducted at the Health Services Command information center at Fort Sam Houston in San Antonio, as well as on advice from other government information centers.

More information can be obtained from the Army Institute for Research in Management Information and Computer Sciences, 115 O'Keefe Building, Georgia Institute of Technology, Atlanta, Ga. 30332.



"If we give one computer the day off, the other computers will want one!"

EVEN IF YOU CHOOSE THE GENESYS HRMS FOR STRICTLY TECHNICAL REASONS, YOU'LL STILL LOOK LIKE A BUSINESS GENIUS!



Get your company's 401(k) up and running on time. Assure payroll that employees' paychecks will immediately reflect any changes in tax laws, benefits, or union settlements. Automatically generate all the reports required for government compliance, as well as all the information needed to respond to discrimination suits. And, they'll call you a business genius.

All it takes is Genesys. The human resource management system that shows you how to contain costs and add hundreds of thousands, even millions, of dollars to your company's bottom line.

Genesys is the only human resource management system to offer a comprehensive benefits module, as well as leading edge personnel and payroll packages.

Everything you need to manage your company's benefits program. Minority tracking. Employee promotions. Applicant control. Manpower planning. Training and development. Skills inventory. Budget analysis. And more.

Genesys is available as a fully integrated system or in separate modules. With or without a production-oriented IMS/database system designed specifically for your IBM mainframe environment. It's also the only HRMS with electronic mail updates. Which means it'll take that much less time for management to see just how smart a businessman you are.

Genesys. It's more than an HRMS. It's a cost containment system that makes you look like a business genius.

Call or write today. Genesys, 20 Ballard Way, Lawrence, MA 01843. (617) 685-5400.

Genesys
SOFTWARE SYSTEMS, INC.

Human Resource Management
That Helps Your Bottom Line

NEWS

Vendors must tell users 'what information really is'

ICP keynote speaker gives advice to execs

By John Gallant
CW Staff

SCOTTSDALE, Ariz. — If they are to prosper in the 1980s, software vendors have to stop selling data "by the pound" and start providing users with more concise and valuable information.

That was only part of the charge made by the keynote speaker to software vendors attending the International Computer Programs, Inc. (ICP) Million Dollar Awards & Executives Conference held here recently. In addition, ICP President Larry Welke said that software developers must take on the job of "teaching the world what information really is.

"The software industry caused information to be as plentiful as it is today," Welke told his audience of software industry executives. "But if we are not careful, users will choke on all that information and that will slow all of you [software vendors] down.

"You must begin to realize that there is such a thing as information precision. You can provide users with less information — information that is more valuable, better controlled and better managed. You must show users that information is a product that can be defined, that has limits. In the coming information society, the power brokers will be those who know what information is and who will pay to get it."

Welke warned industry executives that they must remain cognizant of the changing face of the computer industry if they are to survive in the coming years. One of the most important changes software vendors must deal with today, he said, is the rise of end-user programming, which has been spurred on by the availability of such products as fourth-generation language tools.

"I have seen research that indicates [that] 10% of the programs written in 1984 were written in a fourth-generation language," Welke said. "Four years from now, that figure may be as high as 60%. That will affect you greatly. End-user programming has changed the relationship between end users and data processing professionals, and the relationship between end users, DP and you. It has restructured the DP function."

Welke said end-user programming has spawned the rise of autonomous information, production and development centers within organizations where once the DP department had sole control over information processing.

"That segments the market into which you sell," Welke said. "The organizational decision-making process and the people involved in it are different. The changing environment has even given rise to a new type of person with whom you must work — the chief information officer, who is primarily a businessman where the DP manager was not."

And, Welke cautioned, software vendors must not overestimate the impact of microcomputers on the world of information processing.

"The micro challenge is past tense," he said. "Micros have happened, we have already gone through that revolution. Is the world going to hell in a micro hand basket? No.

"The real value of micros," Welke continued, "is as nodes on a network — not as personal computers but as tools for personal computing. Micros have had an impact on DP but they are only part of the overall picture."

Asis' midyear meeting slated for next month

FORT LAUDERDALE, Fla. — The midyear meeting of the American Society for Information Science (Asis) will be held May 19-22 at the Bahia Mar Hotel here. The theme of the conference is "Telecommunications and Networking."

Topics to be covered at the meeting include telecommunications concepts and terminology, applications of the technology and related governance, policy and management issues.

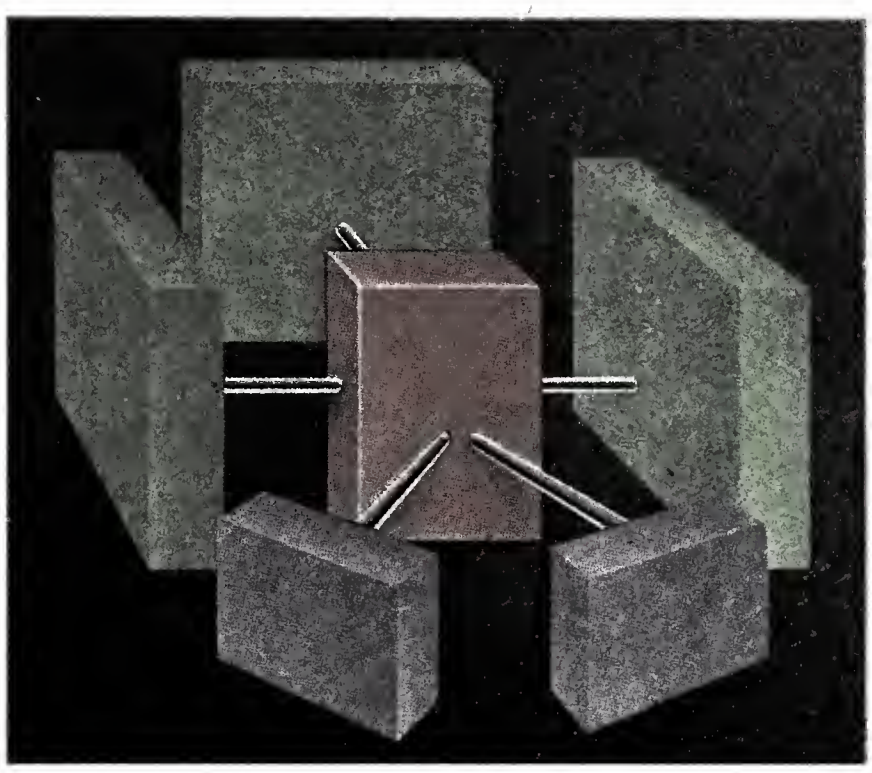
The keynote speaker will be Stephen B. Weinstein, division manager of the Network Services Research Division of Bell Communications Research, Inc. in Morristown, N.J. The keynote address topic will be, "What Can We Expect from the Intelligent Wideband Communications Network of the Future?"

Other scheduled speakers include Edwin B. Brownrigg, director of the Division of Library Automation at the University of California at Berkeley, and John Coppett, district manager of AT&T in Atlanta.

Registration for the conference is $100 for Asis members and $130 for nonmembers.

Further information is available from Asis, which is located at 1010 16th St. N.W., Washington, D.C. 20036.

How to justify your VAXcluster.*



New Quantum RS is the answer. *It is the only resource management system that allows you to report on VAX* or VAXcluster resource usage from one central data base.*

When you require resource accounting, performance analysis, capacity planning, budgeting, cost tracking or chargeback, Quantum RS gives you the information you need to plan, control and react to system requirements.

Take the guesswork out of system management and justify your VAXcluster with Quantum RS.

For a free informative booklet on Quantum RS, please call or return the coupon.

CIS COMPUTER INFORMATION SYSTEMS

165 Bay State Drive
Braintree, MA 02184
Tel. (617) 848-7515

YES! I want to know about how Quantum RS can help justify my VAX.

☐ Please send the booklet and have a representative call me.

☐ Please send the booklet and keep me informed of additional offerings.

Name _____
Title _____
Company _____
Street _____
City _____ State _____ Zip _____
Telephone ( ) _____

Send to: Computer Information Systems, 165 Bay State Drive, Braintree, MA 02184, Telephone (617) 848-7515
Outside Massachusetts, call toll free 1-800-232-5215. CW485

*VAX and VAXcluster are trademarks of Digital Equipment Corporation

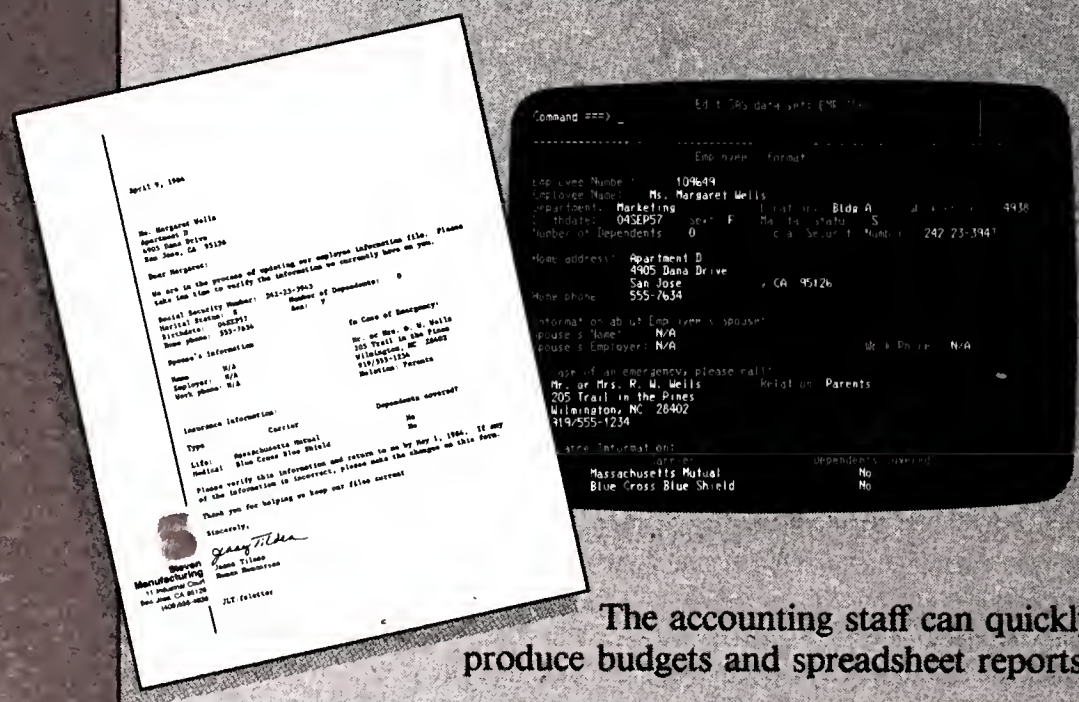
The SAS System. . .

Are your users demanding faster service and more business expertise than your data processing staff can offer? Is your DP staff demanding relief from its applications backlog? Is your management demanding lower development and maintenance costs? Put the SAS® System in your Information Center and you can meet all these demands.

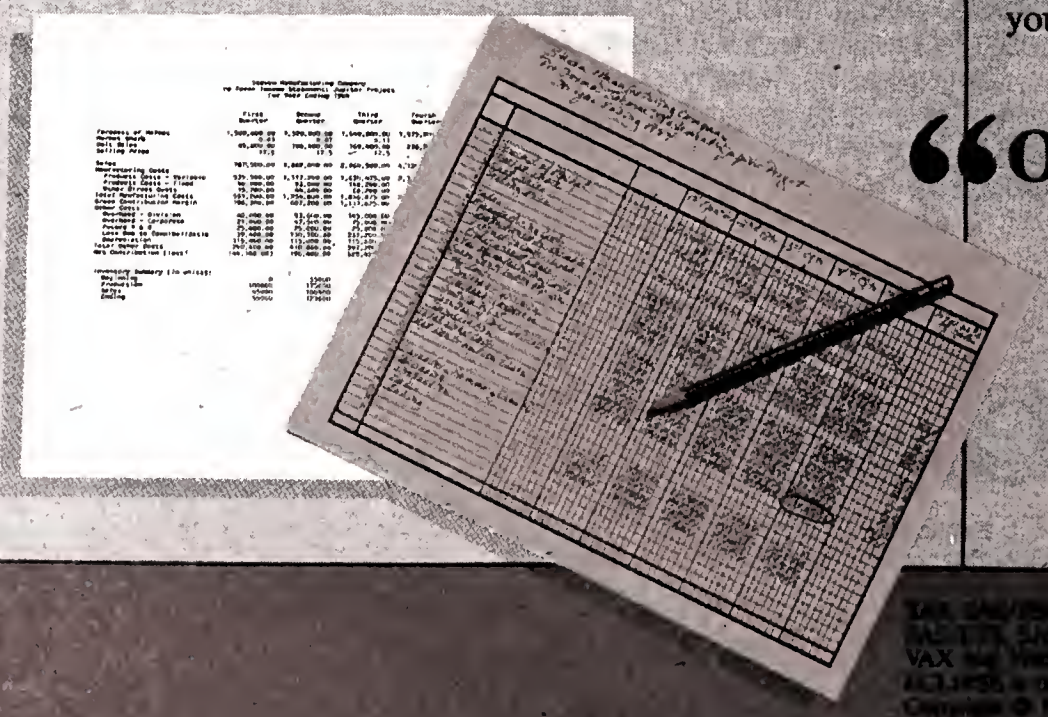
"The SAS System is the one, completely integrated software solution to meet your Information Center needs."

The SAS Solution for End Users

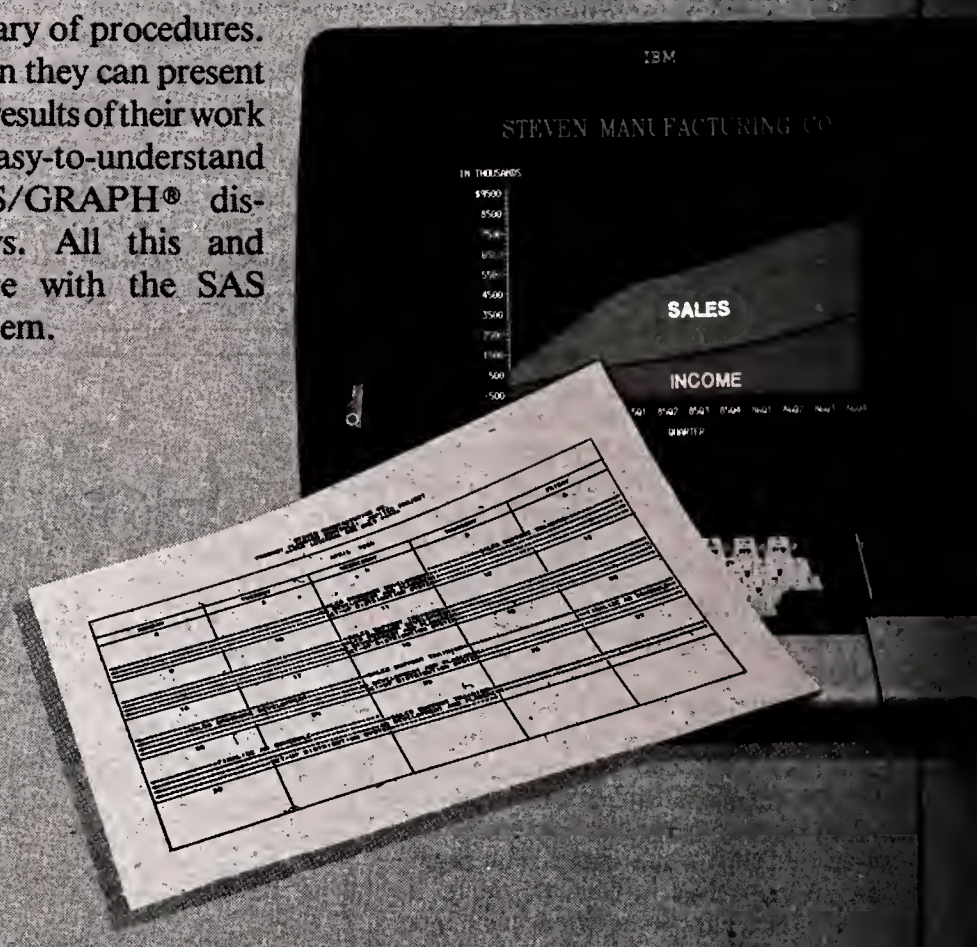
Your marketing staff can use the base SAS® product for sales reports and analyses. Sales representatives can use the full-screen capabilities in our SAS/FSP® product to manage their prospect files and the personnel department can keep track of employee and applicant records.



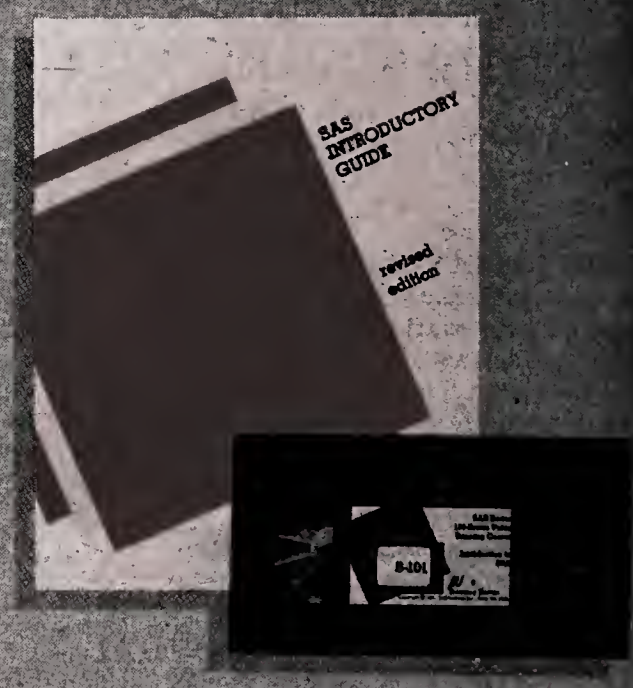
The accounting staff can quickly produce budgets and spreadsheet reports.



Your clerical staff can take orders, track inventories, and produce mass mailings. Managers can schedule projects and determine product mix with our SAS/OR™ product, and combine the results to make accurate forecasts with our SAS/ETS™ library of procedures. Then they can present the results of their work in easy-to-understand SAS/GRAPH® displays. All this and more with the SAS System.



With the SAS System, users only need to learn one language to accomplish all their tasks, and you only need to maintain one set of files for their needs. And one set of easy-to-read manuals and training aids. If they need more help, they can register for public training courses or you can schedule an in-house course for several users. We also develop videotapes to train your SAS users. And you can call us. Our full-time staff of specialists is ready to answer your questions.



"Our services help guarantee that our software will make you more productive."

The Solution for Your Information Center

Now Available for IBM PC/370

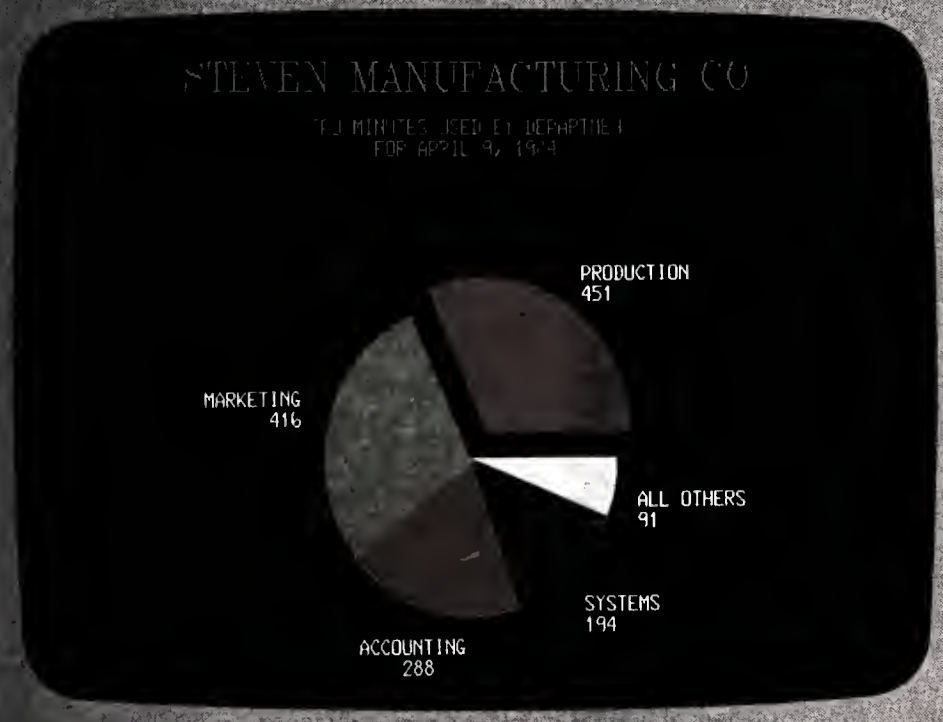
The SAS Solution for Programmers

Once your Information Center is equipped with the SAS System, your DP staff is free to use SAS programming tools to develop complicated reports and analyses, measure hardware resources or system usage, and accomplish many other jobs. Data base administrators can use our SAS/IMS-DL/I® interface to build test data bases and DL/I programmers can implement their IMS-DL/I applications using the simple SAS language.

And with our new SAS/REPLAY-CICS™ tool, your DP staff can develop and store SAS/GRAPH displays in overnight batch jobs, then give them to managers for easy, orderly replay on their CICS terminals.

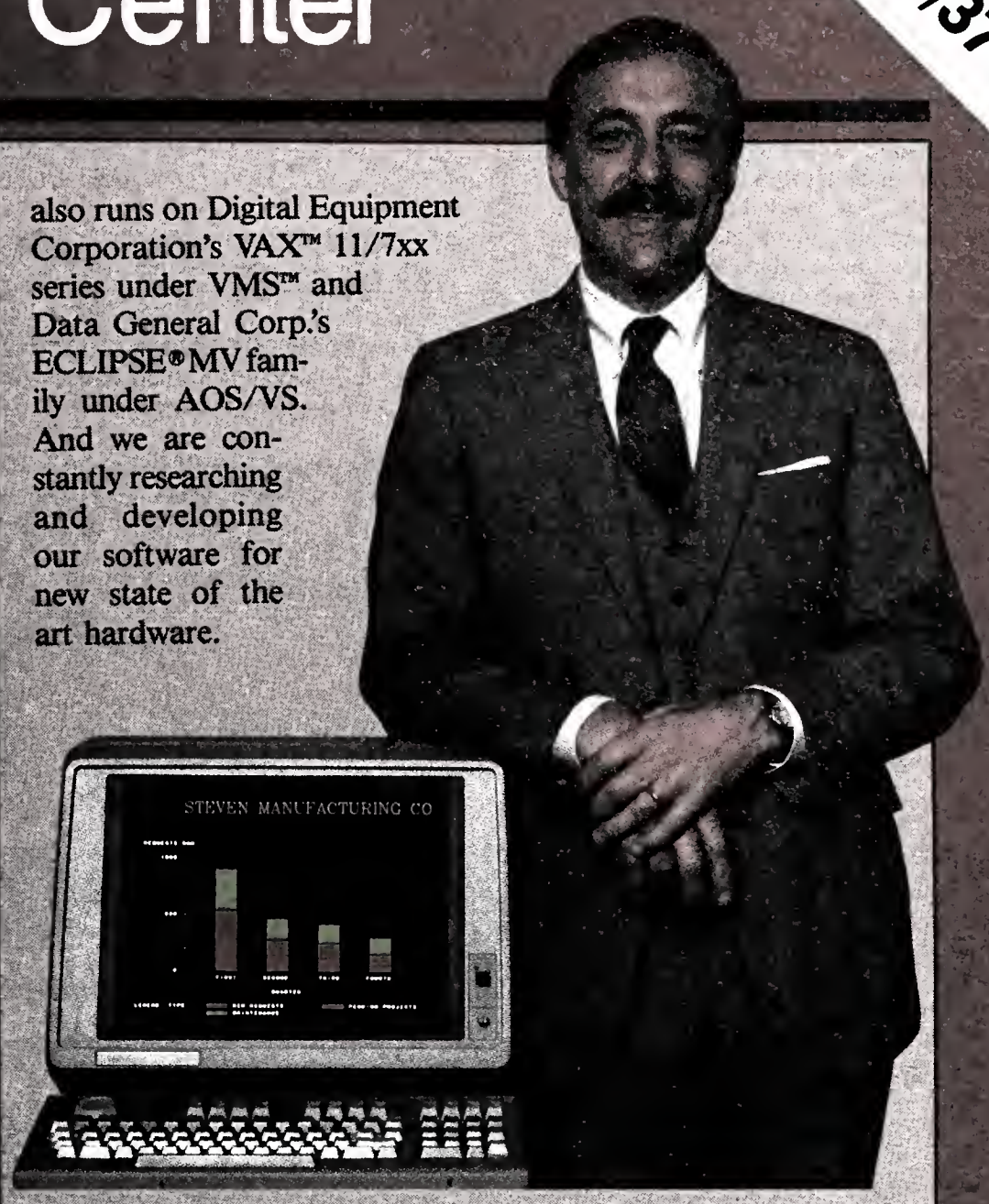
STEVEN MANUFACTURING CO.
VSE SYSTEM USAGE BY DEPARTMENT
FOR APRIL 9, 1984

		CPU MINUTE			I/O COUNT	
DEPARTMENT	JOBNAME	NUMBER OF EXECUTIONS	SUM	MEAN	SUM	MEAN
ACCOUNTING	JACCT110	3	31.32	10.44	11372	3791
	JACCT210	7	36.97	5.57	34968	4995
	JACCT220	6	103.95	12.99	74237	9280
	OTHER2	25	113.76	4.55	56085	2243
HUMAN RESOURCES	OTHER2	16	31.00	1.72	50314	2795
LEGAL	OTHER2	16	17.00	1.06	2216	514
MARKETING	JMKTG170	3	31.35	10.45	13557	4519
	JMKTG200	9	145.36	16.15	159131	17681
	JMKTG215	2	82.33	10.29	43746	5469
	JMKTG220	7	67.01	9.57	132357	12908
	OTHER2	21	29.95	4.22	100880	4204
PLANNING	OTHER6	17	43.00	2.53	27479	1616
PRODUCTION	JPROG200	12	80.47	6.71	107271	6939
	JPROG500	7	170.00	24.29	89020	12717
	JPROG650	4	58.35	14.59	91561	22290
	OTHER2	24	142.12	5.92	108352	4515
SYSTEMS	JSYS525	4	38.47	9.62	22519	5630
	JSY5620	4	24.62	6.15	39212	9803
	JSY2700	4	47.36	11.84	41780	10445
	JSY5850	4	49.67	12.42	40256	10064
	OTHER8	17	33.88	1.99	114291	6723
ALL JOBS		222	1440.00	6.49	1366606	6156



The SAS Solution for You

The SAS System runs on the corporate hardware you've already installed so there's no need to purchase additional equipment for all your new users. The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, VM/CMS, DOS/VSE, SSX, TSO, and ICCF. The SAS System also runs on Digital Equipment Corporation's VAX™ 11/7xx series under VMS™ and Data General Corp.'s ECLIPSE® MV family under AOS/VS. And we are constantly researching and developing our software for new state of the art hardware.



"In short, the SAS System gives you everything you need—at a price you can afford."

So put an end to the demands. Send the coupon or call us today for the solution to your Information Center needs.

SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27511-8000, USA. Telephone (919) 467-8000. Telex 802505.

Outside the US, call our subsidiaries in the United Kingdom, West Germany, France, New Zealand, Australia, and Singapore, or our distributors in Japan, Italy, Israel, South Africa, Brazil, Colombia, Singapore, and Saudi Arabia.

CW4/29/85

☐ I want to learn more. Send me **The SAS Solution** packet.
☐ Have a sales representative call me today!

Please complete this coupon or attach your business card.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ ZIP _____
Phone (_____) _____
Hardware _____
Operating System _____

SAS Institute Inc.
SAS Circle, Box 8000, Cary, NC 27511-8000

SAS®

Long-term view boosts software vendors' survival odds

By John Gallant
CW Staff

SCOTTSDALE, Ariz. — If a software vendor hopes to survive alongside an increasingly software-conscious IBM, it had better develop "well-behaved" products.

Vendors must also sell a "long-term software concept" rather than simply a set of products, said Scott Smith, vice-president of the Gartner Group, Inc. and an IBM watcher. Smith addressed a group of software industry executives at the recent International Computer Programs, Inc. (ICP) Million Dollar Awards & Executives Conference here. He outlined the unique problems and opportunities independent software vendors face in dealing with IBM, which has come to see software as a vital component of its revenue-boosting strategies.

> *'Listen to IBM on its strategic products, and IBM will keep you compatible.'*
>
> **— Scott Smith**
> **Gartner Group, Inc.**

Smith identified well-behaved products as software targeted to what IBM considers its own strategic software offerings.

"If you are a well-behaved applications developer, if you use IBM's operating systems and its strategic development tools and write to its user interfaces, IBM will protect you. If you avoid, ignore or tamper with those strategic products, you do so at your own risk," Smith said. "IBM will not worry about you when it announces a hardware upgrade. That will make it very costly for you to upgrade when IBM does."

The trick, according to Smith, is for the independents to divine which products IBM is not only offering but also emphasizing. For example, "VM is much more strategic than [AT&T's Unix] for IBM," he said. "That is an important difference for software developers to recognize.

"IBM is aggressively educating vendors as to where to deliver applications. Listen to IBM on its strategic products, and IBM will keep you compatible. Otherwise, you run the risk of being a plug-compatible software vendor always trying to catch up. Utilizing IBM's strategic products is the key to compatibility and ease of migration."

Marketing a long-term software concept — as Cullinet Software, Inc. has successfully done — can help contrast an independent vendor with IBM, which faces a number of important problems in presenting a consistent, integrated software line, Smith said. IBM simply has too many software products to maintain because these products are provided to users on a leased rather than a sale basis, he explained.

Big Blue is also hamstrung by the complexity of its structure. Thus, he noted, "It is hard for IBM to develop an integrated solution, as many other vendors have been successful in doing today."

Independent vendors should also seek to build recurring revenue streams, Smith advised. Some of the methods he outlined for doing that included value pricing based on the number of concurrent users, transaction-based pricing and renewable rather than perpetual license arrangements.

In the software pricing arena, he said, IBM is actually providing a service to the independents through its emphasis on lease pricing and its regular, periodic price increases.

"IBM is educating users to pay more for software as an increasingly important part of the overall product," Smith said. "That helps all of you."

IBM's software strategy

According to Smith, the basics of IBM's software strategy involve the following:

- Narrowing its software focus.
- Providing software that has close ties to IBM hardware.
- Providing software critical to account control.
- Providing software that can be leveraged across the broad installed base of IBM hardware.
- Focusing on market areas where there is little threat of competition.
- Building a consistent set of interfaces for both applications developers and end users.
- Enforcing the standards necessary for distributed processing.
- Educating and encouraging third parties to fill niche needs.
- Enhancing the functions of its software and increasing prices.

"The [independent] software industry has a number of things going for it today," Smith said. "There is no substitute for software, and there is as yet no downward price trend in the software market. There is no evidence that IBM will take over everyone in the industry."

Introducing.
Software for the operations manager.

The automated DOS/VSE data center.



It's Corodale's new System/Scheduler. A better way to log, schedule and monitor processing activity.

System/Scheduler organizes the data center. Eliminates no runs, misruns and reruns. And adds efficiency, accuracy and integrity.

Moreover, we can prove it with a no-obligation trial. Your facilities. Your work. Your savings.

Simply call us at 617·426·8780. Or write: Corodale Incorporated 133 Federal Street Boston Massachusetts 02110.

Telex 710·3216747

To compile or not to compile? IBM now agrees with Cincom.

It's the age-old question in application development.

Is it better to have the many advantages of interactive, flexible, compile-free application development? Or do you sacrifice these valuable benefits for the sake of a perceived performance improvement?

At Cincom, we don't think you can afford the sacrifice. That's why we developed MANTIS,® our industry-acclaimed, interactive interpretive application development system.

Released in 1981, MANTIS provides invaluable application development support that compiler technologies simply can't match. Powerful end-user prototyping capabilities. Interactive end-user involvement during development. The ability to make changes quickly and easily—without great expense.

Now, with their most recent release of (and obvious commitment to) the compile-free Cross System Product, another software vendor appears to agree. IBM.

To which we say, "Congratulations, IBM."

Because IBM now acknowledges what Cincom has been saying all along—interactive interpretive technology is the right way to go.

And MANTIS is the right way to go in interpretive technology.

A key component in our TIS™ family of application development and information control systems for business, MANTIS truly is the industry's premier application development technology. Just ask our 1,800+ satisfied MANTIS customers around the world.

So call Cincom today. Now that IBM is finally endorsing interactive interpretive technology, we're sure you'll want to learn more about the power and performance of MANTIS—the leader in interactive interpretive application development.

After all, now that IBM is on our side, how can you go wrong?

Cincom Systems

A world of experience for today's business world.

1-800-543-3010

In Ohio: 513-661-6000 In Canada: 416-279-4220

Cincom Systems, Inc. World Headquarters, 2300 Montana Avenue, Cincinnati, Ohio 45211

NEWS

Canadian DEC top vendor in country's computer count

Ontario boasts most installed systems

By Donna Raimondi
CW Staff

TORONTO — The lion's share of the computer business in Canada belongs to Digital Equipment of Canada, and the province with the most computer installations is Ontario.

These are statistics determined by the 1985 Canadian Computer Census published recently by the Canadian Information Processing Society. At the end of 1984, 3,246 computers out of the total of 13,607 computers for all provinces were Digital Equipment of Canada equipment. IBM Canada Ltd. followed closely with 3,118 computers, the report said.

The census contains a list of systems in Canada whose CPUs cost at least $70,000 or which rent for $1,000 or more per month, the report said.

Of the 13,607 computers rented or purchased in Canada, 5,887 reside in the province of Ontario, the study showed. The province of Quebec accounts for 2,480 installations; British Columbia shows 1,602 systems; and Alberta has 1,467.

Trailing the pack was the Yukon, with a total of nine reported computer installations.

Manufacturers account for the largest number of machines (2,501) across all classes of rentals, the report said. A large share of those manufacturers' rentals (859) are in the $2,000 to $4,999/mo range, suggesting computer systems in the $70,000 to $174,999 sales price range, the report said. Machines in the $35,000 to $69,999 class (rentals of $1,000 to $1,999/mo) account for another 701 rentals by manufacturers.

Government leads large system rentals

The Canadian government is the next largest renter in the country, with a total of 1,578 rentals, of which 442 are in the $2,000 to $4,999/mo range, and 578 are in the $1,000 to $1,999/mo span, the study said. The government is by far the biggest renter of large systems. It accounts for 46 rentals in the $100,000/mo and over category, suggesting machines with purchase prices of $3.5 million and up.

Other big-machine users are service bureaus (computer systems and software companies) with 35 rentals of $100,000/mo or more; insurance companies, with 29-large system rentals; and financial institutions, with 28 such rentals, the study said.

Service bureaus rent 1,466 systems, with 533 of those systems in the $1,000 to $1,999/mo range and 435 in the $2,000 to $4,999/mo span. The service bureaus also have 227 systems in the $5,000 to $9,999/mo span, which translates to machines that cost $175,000 to $345,999, the study said.

Wholesale and retail distribution businesses account for another 1,411 rentals in Canada, most of which are in the small systems category. Other industries whose installations are measured by rental class include primary or resource industries (agriculture, forestry, fisheries, mining), construction, transportation, utilities, communications, service (unions, professions and associations), petroleum, educational, medical, legal, accounting and hospitality.

> *The Canadian government is by far the biggest renter of large systems.*

Of the smaller systems rented in Canada, Digital Equipment of Canada leads the pack of vendors with 1,296 of the $1,000 to $1,999/mo machines; 836 of the $2,000 to $4,999/mo systems; and 609 of the $5,000 to $9,999/mo class installations.

IBM trailing in smaller markets

IBM trails Digital in the smaller markets, although it comes close in the $2,000 to $4,999/mo category, with 832 installed systems, the report said.

IBM takes over in the three ranges that bridge the $10,000 to $99,999/mo rental classes, suggesting machines ranging in value from $350,000 to $3.5 million, the study said. It accounts for 371 systems rented in the $10,000 to $19,999/mo range ($350,000 to $699,999 cost); 330 installations in the $20,000 to $49,999/mo rental span ($700,000 to $1,749,999 cost); and 148 rentals in the $50,000 to $99,999/mo range ($1,750,000 to $3.5 million price), the study said.

The census report includes tables on computer installations in Canada by manufacturer within province; by industry within rental class; by manufacturer within rental class; by manufacturer within industry; and rental class by province.

It also contains a historical record from 1964 to 1984 by province or territory and a list of installed computers by province, city, user and type.

The study is available for $150 from the Canadian Information Processing Society, 243 College St., 5th Floor, Toronto, Ont. M5T 2Y1.



The cost of transmitting data just keeps getting lower and lower. Thanks to Datagram. And our line of inexpensive, yet immensely talented modems.

All are totally soft and down-line loadable, have built-in signal quality monitoring, and run on unconditioned voice grade lines. Yes, that's right. Even our 14400 with built-in six channel buffered mux which sells for under $5,000. Unbelievable? No, just Datagram know-how.

Our 9600 point to point modem is a real work horse at only $1495. But if you want a 9600 with a four channel buffered mux, we've got that too at only $1895.

At $1395, you can't beat our 4800's. In a multi-drop application they'll train in 50 ms. More importantly, you can test all modems from the central site.

On top of that, all our modems are preconfigured at the factory, so all you have to do to get them going is connect them to the line.

We can have modems in your hands in just 72 hours. So call now, 1-800-235-5030 and order your Datagram modems today.

Datagram

We make networks work harder.

USA: Datagram, 11 Main Street, East Greenwich, Rhode Island 02818
Canada/International: Datagram Inc., 1451 Graham Bell, Boucherville, Quebec, Canada J4B 6A1
Branch offices in major cities.

TeleVideo corrects the VT220 key mistakes.

The new TeleVideo® 922 shares but one feature with the VT220®: DEC®-compatibility. The similarity ends there.



TeleVideo 922

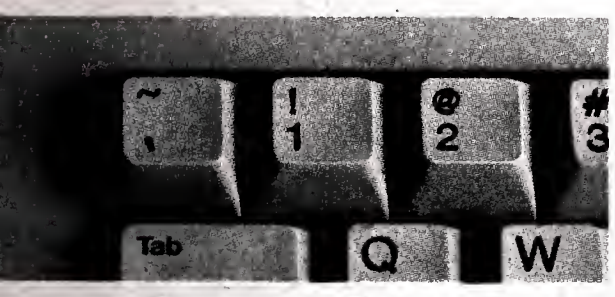
1. Take our keyboard, for example. The RETURN key is within direct, easy reach. But VT220 users must stretch over an additional key to hit RETURN. Or have the hands of a concert pianist.



DEC VT220



Here's ours.



Where's the VT220 ESCAPE key?

2. Our ESCAPE key is located above the TAB key, right where you'd expect to find it.

Theirs isn't.

In fact, you have to go hunt for the VT220 ESCAPE key halfway across the row of function keys.

3. Take a look below at the 922 keyboard. That's a true accounting keypad, complete with a Clear Entry, Double Zero and a TAB key. Not merely the numeric keys you get with the VT220.



4. Our SHIFT key is exactly where it should be, so it does exactly what it should do—shift. Their SHIFT key is shoved over by the < and > key to create lots of < and > on the CRT. Of course with a little practice, you could relearn their keyboard. But why, now that you've seen our 922?



922 Display Screen.



VT220 Display Screen.

5. And after we built a better keyboard, we built a better terminal. With exceptional reliability. Quality. Advanced ergonomics. Everything you'd expect from the industry ANSI leader.

The new 922 is available now and priced to move now. And it's backed by a worldwide sales and support network.

6. Here are 5 more advantages to the 922.

	TeleVideo 922	DEC VT220
Programmable Function Keys	15 (30 with shift)	15 (shifted only)
True Accountant Keypad	YES	NO
Plug-in Graphics Upgrade Option	YES	NO
Full Tilt & Swivel	YES	NO
Enhanced ANSI Mode	YES	NO

DEC, VT220 are registered trademarks of Digital Equipment Corporation.

800-538-8725.
In California, call 408-745-7760.

The TeleVideo® 922

TeleVideo Systems, Inc.

"Now $799"

Three more firsts from the people who invented the wheel.



XEROX

From day one, Xerox and Diablo have been known as the two best names in daisywheel printers. And now there are three more in the Xerox line to choose from.

The Xerox Advantage D-25 Diablo printer turns out letter quality documents quickly and quietly. And it does all that for the price of a dot matrix printer.

At 80 c.p.s., the D-80IF is the fastest daisywheel printer ever made by Xerox. It has a built-in double bin sheet feeder. As well as the capacity to handle up to 16 computers at once.

And the D-36 spells reliability. It averages 4,000 hours of printing between maintenance calls.

But Xerox didn't stop there. Each of these new machines is compatible with most computers on the market, including the IBM-PC. And they're all easy to use.

They're also a part of Team Xerox, so they can be serviced by the national Xerox service force and authorized service locations across the country.

So if you're looking for the latest in daisywheel printing technology, go with the people who've been in the business the longest. Call 1-800-833-2323, ext. 25, your local Xerox office, an authorized Diablo or Xerox dealer or send your business card to Xerox Corporation, Dept. 25013, P.O. Box 24, Rochester, NY 14692.



XEROX® Diablo® and the identifying numbers are trademarks of XEROX CORPORATION
IBM® is a registered trademark of International Business Machines Corporation

DEC™ USERS
THE TIME IS RIGHT FOR
FORMATIX™

A FOURTH GENERATION PROGRAMMER PRODUCTIVITY TOOL

Would you like to eliminate 90% of program development time?
Would you like to create programs with no knowledge of programming?
Do you generate code for applications such as Accounts Payable, Accounts Receivable, Order Entry, Payroll, Insurance, Banking or any other Business Application?

"Programs can be up and running in 30-60 minutes, compared to normal hours or days it takes to code, complete, test and debug a program in a traditional language."

The time is right to expand your business now!
For a FREE TRIAL DEMONSTRATION of the POWER of FORMATIX on your VAX™ or PDP/11™.
Call Howard Nestler at **(201) 972-0032**

ISKRA SOFTWARE INTERNATIONAL
A Division of Iskra Electronics Inc
PRODUCTIVITY SOFTWARE FOR DECISION MAKERS
222 Sherwood Ave. Farmingdale, NY 11735
DEC, VAX and PDP/11 are trademarks of Digital Equipment Corporation. FORMATIX is a trademark of Iskra Software International

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

BRISBANE — The first in a stream of Digital Equipment Corp. VAX 8600 systems has been installed here at Queensland Newspapers Pty. Ltd. The Queensland Newspapers' 8600 is thought to be the first such installation outside the U.S.

DENMARK

COPENHAGEN — The Danish state-run telephone company, KTAS, has signed a $14 million contract that spans 10 years with Siemens AG. Under the terms of the agreement, Siemens will provide the phone company with digital switching equipment for telephone exchanges.

FRANCE

PARIS — France's state-owned computer giant, Bull, just signed a $6.5 million agreement with China to be the supplier of Bull DPS 7 mainframe, five DPS 6 minis and 54 Micral 30 micros. The contract, signed with the Chinese National Technical Import Corp. (CNTIC), will provide equipment for 10 Chinese universities and agricultural research centers. In addition to hardware, the agreement calls for Bull to send applications engineers to China for in-house training and to host 50 Chinese trainees in France. Bull is the first European high-technology firm to win an order from CNTIC.

WEST GERMANY

HANNOVER — More and more developers of micro software are turning down copyright protection for their programs. A recent example of this trend was evidenced here by Microrim, Inc. and its German distributor RHV-Softwaretechnik, which refused to protect their relational data base program R:Base 4000. According to RHV spokesman Klaus Spieker, the ratio of purchased software to copied programs for commercial use here does not exceed 1:2.

■

HANNOVER — In spite of the slump in the U.S. semiconductor industry, the German market is booming. Industry insiders expect a successful sales year for 1985, according to Friedrich Ruf, chairman of the Union for Electronic Components. Ruf voiced his opinion at Germany's Hannover Faire, stating that the union predicts increases in semiconductor sales of almost 9%, amounting to $3.6 million this year.

■

MUNICH — A recent user survey conducted here revealed that German DP professionals most often preferred IBM machines to plug-compatible equivalents from BASF, National Advanced Systems, Inc. and Nixdorf Computer GmbH. The "overall satisfaction" survey, conducted during January by Datapro Research Corp. and *Computerwoche*, the German subsidiary of *Computerworld*, polled 800 computer users. The machines that got the highest marks included the IBM 3080 series, Bull's DPS 7 and the Fujitsu Ltd. 7800 system, which Siemens AG sells here. The top-rated mini maker was Tandem Computers, Inc. with its line of Nonstop systems, followed by IBM and its System/38.

Burroughs announces our second hundred year plan.

A hundred years ago, with the introduction of the first adding machine, a company was founded with one single objective: to make business more cost-efficient.

A century later, celebrating our centennial year, Burroughs Corporation has become a worldwide leader in information processing systems geared to helping businesses improve the bottom line.

Today, in an age when productivity is threatened by information overload, the need for cost-efficient information management is greater than ever.

Which is why Burroughs is rededicating our efforts to making our products, services and support systems more cost-efficient and productive than ever before. This commitment to the future is symbolized by our new corporate logo.

We've focused our resources on specific lines of business—emphasizing finance, manufacturing and distribution, health care, government and education among others. And we've developed complete systems to meet their special information processing problems.

In the area of new products, we've designed a family of mainframes that costs less to run, needs fewer support people, and allows users to increase processing power up to 70 times without reprogramming.

Plus, we've developed software that brings the programming and operational ease of personal computing to mainframes. And equally remarkable software that increases programmer productivity up to an astonishing 1000%.

Of course, Burroughs has the office and data processing products and supplies to go with our systems.

And we offer a lot more.

Like our System Development Corporation—an acknowledged leader in secure networks and systems integration. And our Memorex unit—offering highly advanced storage devices for Burroughs and other systems complemented by a wide range of peripherals.

Finally, to help our people put our plan into practice, we've recently spent $67 million on personnel training and more than $100 million on service and support facilities.

In an industry where many companies don't last a decade, Burroughs is proud to be launching our second century.

The experience and insights we've gained are helping us develop new solutions that will benefit our customers and their profitability for the next hundred years.

Burroughs

©1985 Burroughs Corporation

OF THE BIG THREE IN BUSINESS SOFTWARE TODAY, WHO'LL BE ON TOP TOMORROW?



If you look at the big three, you see that each of us has a fast growth rate, and each claims to have "total-solution" software. A multiplicity of packages that give you complete mainframe capability, plus a PC link.

But whose total solution is best? If you agree that success is the reward for a job well done, you may agree with the prediction we make at McCormack & Dodge.

The company that's on top tomorrow will be the company that's on top of your business problems today. With the solutions that are easiest to apply—the solutions that promise the fewest future headaches.

When you're talking "total solution," this can mean only one thing. The product line that works best as a totality will be the easiest and most effective for all parties. User and vendor alike.

We believe your own analysis will quickly point out which of the big three has the most integrated family of products. Even though all three claim total integration.

We believe you'll find that two companies offer the mere appearance of integration. An agglomeration of business applications linked superficially, through hinges, patches, shadow files and masks.

While one offers the real thing. Millennium. A true family of business software in which the whole works as smoothly as any part. In which every package has the same query mechanism, the same report writers, the same screen generation, the same on-line documentation, security and real-time capabilities. So that when the packages are put together, there are absolutely no borders between them. They fit like pieces in a jigsaw puzzle. Making the most efficient use of all your data processing resources.

There's even a Millennium application development tool, so you can create new systems as you need them. Without slow, expensive programming.

Of the big three in software today, who'll be on top tomorrow?

Don't stop asking until you know.

McCORMACK & DODGE

McCormack & Dodge, 1225 Worcester Road, Natick, MA 01760
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

ONE THING VT200 IMITATORS CAN'T BEGIN TO IMITATE.

In a world full of imitators, it's an easy mistake to assume that any terminal that looks like a VT200™ will perform like a VT200. After all it's no major task to imitate the most superficial features of a video display terminal.

But there's one test of a video terminal that simply can't be judged in a 15 minute demonstration.

The toughest test of all. The test of time.

While other display terminals were designed to impress you in the showroom, Digital's VT200 series was designed to make a more lasting impression. To keep you comfortably productive years down the road.

That's what inevitably separates an industry standard from the rest.

And why so many professionals return time and time again to products with the Digital logo.

THE DIGITAL LOGO MEANS LONG TERM PRODUCTIVITY.

It's no coincidence that the VT200 family was designed by engineers who, like end users, sit in front of display terminals day in and day out. They've discovered the shortcomings, the idiosyncrasies and all the subtle little problems that can end up robbing you of productivity.

As a result, some of the VT200's best features are ergonomic. The angle of the screen. The sculpture of each key. The design of the keypad.

These are the things that become most apparent after hours of prolonged use. And often spell the difference between a terminal that's a genuine productivity tool and one that's – quite literally – a pain in the neck.

The fact is, the VT200's ergonomic design and the resulting ease of use were two of the reasons it won the International Design Award, in both 1983 and 1984.

THE DIGITAL LOGO MEANS LONG TERM COMPATIBILITY.

Whether you're looking for a terminal for your VAX,™ DECsystem or PDP-11™ based system, the VT200 has a rather obvious advantage over any other terminal you might consider.

We built the host. As well as the other peripherals you'll be using.



*Independent study conducted by International Data Corporation among users of the top 10 computer brands

© Digital Equipment Corporation 1985. Digital, the Digital logo VT200, VAX, PDP-11 VT52, VT220 VT240, VT241 are trademarks of Digital Equipment Corporation

So it only makes sense that our video terminals are substantially more compatible up and down the Digital family line. Each new generation, for example, brings with it all the important elements from previous generations. Which is why you'll find some of our customers using 10 year-old VT52™ terminals with brand new VAX systems. The simple fact is, Digital has always been committed to protecting your investment with every move you make.

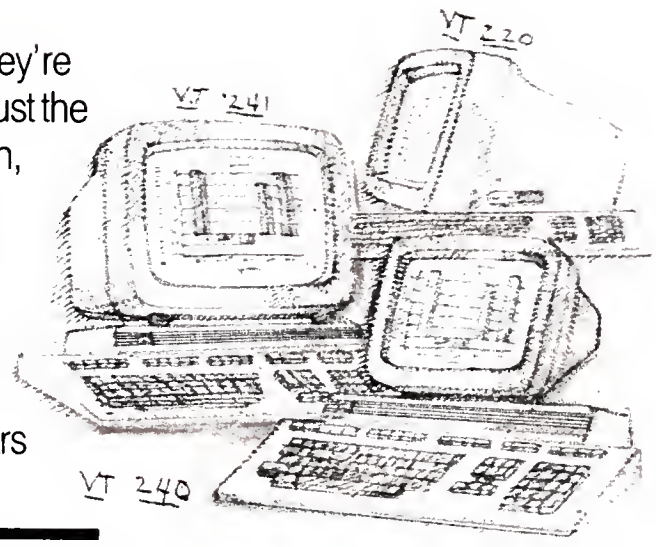
In addition, our breadth of product line means Digital can provide you with a total solution. Hardware, software and peripherals. And while single sourcing is not an end in itself, it certainly provides an extraordinary measure of convenience, compatibility and reliability. Particularly when the single source is Digital.

THE DIGITAL LOGO MEANS LONG TERM RELIABILITY AND SUPPORT.

When asked to single out the strongest feature of Digital's video terminals, many users point to the most visible asset of all. Durability.

Over the years, we've heard some pretty gruesome stories about the ordeal our terminals have endured. Like coffee that was spilled on keyboards. Or cables that were inadvertently ripped from their ports. They've even survived trial by fire. While it's unreasonable to expect even the toughest video display to come through every major trauma unscathed, it's comforting to know your terminal has a reputation for survival.

It's equally comforting to know you've got a support team behind you every step of the way. A support team rated the best in the business by users.* They're there for everything. Not just the repairs, but system design, training, updates, education and seminars. All to make sure you get the absolute maximum from your video terminals. Today, tomorrow, and years down the road.



BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The VT220,™ VT240,™ and VT241,™ like every Digital hardware and software product, are engineered to conform to an overall computing strategy. This means our products are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy from desktop to data center.

For a detailed brochure or more information, as well as the name of the Authorized Terminals Distributor or Digital Representative near you, call 1-800-DIGITAL, extension 702. Or write Digital Equipment Corporation, 129 Parker Street, Maynard, MA 01754.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

digital™



Hannover Faire to trim size

CW PHOTO BY SUSAN BLAKENEY



Hannover Faire's exhibition floor

By Susan Blakeney
CW Staff

HANNOVER, West Germany — The big news at West Germany's — and possibly the world's — biggest trade show was not necessarily on the product floor but behind the scenes. It was there that the decision was made to make this year's Hannover Faire the last one of its kind.

Billed as "The Fair of Fairs," the Hannover Faire's reputation for drawing mammoth crowds went unchallenged this year as approximately 800,000 attendees from 44 countries flooded through its gates.

The fairgrounds, consisting of 24 separate exhibition halls and parking for 50,000 cars, showcased a record 6,778 exhibits. And despite its vast proportions, scores of would-be exhibitors had to be turned away this year.

Show size scaled down

This reason, coupled with the city's inability to handle such an infusion of people, forced the consortium of city and state government agencies that sponsors the annual April event to decide to pare the show down.

The hotly debated topic pitted people who wanted the show to remain the same against those that favor taking the World Center for Office, Data and Communications Technology (Cebit) segment out of the show.

This year the Cebit exhibits spanned five exhibition halls, occupied 18% of the show's floor space and attracted roughly 250,000 guests.

The concept behind breaking the Cebit exhibit out from the main show is ostensibly to "make the Hannover Faire more attractive by featuring new technologies and creating a more industrial accent," which is not deemed possible given present space contraints, according to show sponsors. The sponsors decided to hold a separate Cebit show next year on March 12-19. The remaining part of the Hannover Faire, featuring manufacturing, engineering and agricultural equipment exhibits, will take place during the week of April 9-16, 1986.

Critics of the plan to seperate the Cebit show from the main event claim that the Hannover Faire — and thus the city of Hannover — will ultimately suffer. They claim the show's big drawing factors are its size and great mix of people.

"The best thing about Hannover Faire is that everyone is here. That will not be the case next year. And I do not think people can afford to come to both," according to Wolfgang Veder, a computer engineer with the West German board of agriculture.

"If they could fit more vendors in I think they would keep the Hannover Faire the way it is. But they are losing money when they turn people away," Veder added.

The concerns of show aficionados notwithstanding, city restaurants, taxi lines and hotels will be slightly less populated during next year's Hannover Faire. Show sponsors, steadfast in their decision, argued that future shows will allow "greater emphasis [to be] placed on key target groups," and that the increased display space freed by dividing the Cebit show from the Faire will "improve the character of the Hannover Faire."



IF YOU'RE BUYING
WILL THE COMPETITION

FOR INTEGRATED BUSINESS AUTOMATION, DISCOVER
DATA GENERAL'S CEO® SYSTEM.
IT'S WHY WE'VE WON MORE MAJOR INTEGRATED SYSTEM CONTRACTS
THAN ANY OTHER COMPANY.*

Today, survival means finding a business automation system that reaches every facet of your corporation.

Companies such as E.F.Hutton, Pactel Communications, Centel and Beneficial Corporation chose Data General.

BEYOND OFFICE AUTOMATION

Data General's CEO® System begins with all the office administration essentials. And takes you further to Business Automation. With spreadsheet, graphic and database tools to help your staff make faster, better-informed business decisions. And because you can integrate these tools with your business applications, everyone has access to all the information they need.

Our communications networks put the

*Integrated systems contracts over $25,000,000 (does not include military, component and service awards), as reported in Electronic News, MIS Week and Computer Systems News between January 1, 1983 and December 31, 1984.

CALENDAR

WEEK OF MAY 26

MAY 28-30, KINGSTON, ONTARIO — **15th Annual Symposium on Multiple-Valued Logic.** Contact: H. T. Mouftah, Department of Electrical Engineering, Queen's University, Kingston, Ont. K71 3N6, Canada.

MAY 28-31, NEW ORLEANS — **The Seventh National DEC-Compatible Industry Exposition (Dexpo South '85).** Contact: Angela Wright, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

MAY 28-29, CHICAGO — **VS Cobol II.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held May 30-31 in New York.

MAY 28-31, SAN FRANCISCO — **CICS Application Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held May 28-31 in New York.

MAY 28-31, NEW YORK — **TSO IPF.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

MAY 29-30, DALLAS — **Opportunities and Pitfalls.** Contact: Ken Orton, Future Computing, Inc., 8111 LBJ Freeway, Dallas, Texas 75251.

MAY 29-31, SAN FRANCISCO — **Introduction to Data Communications.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015. Also being held May 29-31 in Houston.

MAY 29-31, BOSTON — **International Conference on Computerization of Medical Records.** Contact: Peter Waegemann, The Institute for Medical Records Economics, Inc., 121 Mount Vernon St., Boston, Mass. 02108.

MAY 30-31, BOSTON — **Negotiating Computer Contracts.** Contact: Law & Business, Inc., Harcourt Brace Jovanovich, Publishers, 855 Valley Road, Clifton, N.J. 07013. Also being held June 17-18 in San Francisco.

MAY 30-31, WASHINGTON, D.C. — **Legal Issues in Acquiring and Using Computers.** Contact: New York University, School of Continuing Education, 575 Madison Ave., New York, N.Y. 10022.

MAY 30-31, SAN FRANCISCO — **Managers' Roundtable.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

WEEK OF JUNE 2

JUNE 2-5, DALLAS — **American Bankers Association's 1985 National Operations and Automation Conference.** Contact: American Bankers Association, Communications Group, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

JUNE 3-4, BOSTON — **Fundamentals of Data Processing for Administrative Assistants and Secretaries.** Contact: New York University School of Continuing Education, 575 Madison Ave., New York, N.Y. 10022. Also being held June 20-21 in San Francisco and June 27-28 in Los Angeles.

JUNE 3-5, MONTREAL — **Canadian Information Processing Society Congress '85.** Contact: Canadian Information Processing Society, Fifth Floor, 243 College St., Toronto, Ont. M5T 2Y1, Canada.

JUNE 3-5, SAN FRANCISCO — **Long-Range Information Systems Planning.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020. Also being held June 17-19 in Boston.

JUNE 3-6, CHICAGO — **IMS/DB (DL/1) Application Programming.** Contact: Technology Solutions, Inc., 520 Fifth Ave., New York, N.Y. 10036. Also being held June 24-27 in Washington, D.C.

JUNE 3-6, CHICAGO — **Vtam: From Start to Finish.** Contact: Technology Solutions, Inc., 520 Fifth Ave., New York, N.Y. 10036. Also being held June 17-20 in Boston and Atlanta and June 24-27 in Los Angeles.

JUNE 3-6, FORT LEE, N.J. — **CICS/VS MRO/ISC.** Contact: Technology Solutions, Inc., 520 Fifth Ave., New York, N.Y. 10036. Also being held June 3-6 in Los Angeles, June 17-20 in San Antonio and June 24-27 in Fort Lee, N.J.

JUNE 3-6, DENVER — **Vsam: Its Structure and How to Use It.** Contact: Technology Solutions, Inc., 520 Fifth Ave., New York, N.Y. 10036. Also being held June 10-13 in Fort Lee, N.J.



YESTERDAY'S TECHNOLOGY, BURY YOUR BUSINESS?

pieces—from the most popular PC's to mainframes—together into one accessible, information mainstream.

And a range of Data General's compatible systems—from portables to department-sized clusters, to superminis—can fit even the most unique business problems.

YOUR BEST BUSINESS INVESTMENT

Our commitment to research and development protects your current investment. We offer a wide selection of service, training and support plans to forge your system into a cohesive, competitive weapon.

Yesterday's technology won't fit your needs in tomorrow's business battles. To keep your company alive, talk to Data General at 1-800-DATAGEN (In Canada 1-800-268-5454) or write: Data General, 4400 Computer Drive, MS C-228, Westboro, MA 01580.



Data General
a Generation ahead.

© 1985 Data General Corporation, Westboro, MA. CEO is a registered trademark of Data General Corporation.



Now that you've formed a lasting relationship

With more than 100,000 boards installed so far, IRMA™ has become the standard micro-to-mainframe link in the 3270 environment.

That's just the kind of success that gives a company a lot of big ideas.

Like IRMAline™ and IRMAlette™, remote PC-to-mainframe links that work with the ease of IRMA. IRMAprint™, a 3287 emulator. IRMAcom™, a board that will emulate a 3270 controller. IRMAkey/3270™, a keyboard that puts PC and terminal functions together. And IRMAvision™, a new monochrome display adapter for any IBM personal computer. When used with IRMA, it emulates a 3278 terminal mod two through five.



with IRMA, isn't it time you met the family?

With that kind of exciting hardware, we wouldn't think of disappointing you with any of our new software products.

For example, IRMAlink FT/TSO™ and FT/CMS™, two host-based file transfer systems. And the new IRMAlink FT/3270™, software supporting IBM's PROFS and PROFS PCC.

All compatible with IBM PCs, XTs and ATs.

Find out more. Just call 1-800-241-IRMA. Or Telex 261375 DCA UR.

dca®
Digital Communications Associates, Inc.

IRMA, IRMAline, IRMAlette, IRMAprint, IRMAcom, IRMAkey/3270, IRMAlink FT/TSO, IRMAlink FT/CMS, IRMAlink FT/3270 and IRMAvision™ are registered trademarks of Digital Communications Associates, Inc. DCA is a registered trademark of Digital Communications Associates, Inc. IBM is a registered trademark of International Business Machines Corporation.

EDITORIAL

Japan blinks

The doors to the lucrative Japanese telecommunications market are opening, but not wide enough nor quickly enough to satisfy the trade expectations of the U.S. Congress or the U.S. telecommunications industry.

At stake is Japan's $4.5 billion telecommunications market. It is turf the Japanese want to protect and the Americans want to attack. Throw in the wave of protectionist sentiment sweeping through Congress, and the scenario has all the explosive ingredients of a nasty little trade war — unless one side blinks, and Japan has.

Telecommunications is only one market of four key areas that dominate this latest round of U.S.-Japan trade talks. The others are medical equipment/pharmaceuticals, electronics and wood and paper products.

Talks in all areas recessed late last month except for telecommunications. U.S. negotiators had hoped to conclude the telecommunications talks by April 1, but they will likely continue as Japan steps up its effort to resolve disputes before the annual seven-country economic summit next week in Bonn.

Much intense negotiation has taken place amid mounting trade frictions and under the watchful eye of Congress. Japan clearly fears that Congress is in the mood to restrict Japanese imports unless Tokyo moves quickly to open up its markets for U.S. goods and to reduce fees, licensing requirements and other obstacles that prohibit expansion of U.S. industries in Japan. In short, Congress wants Japan to give the U.S. the opportunity to close its $37 billion trade deficit with that country. Or, as summed up by Secretary of State George Schultz: "We want to hear the cash register start ringing."

In the telecommunications area, Japan recently has taken the following steps to reduce tension with the U.S.:

- Simplified standards and regulations that American imports must meet in the Japanese market.
- Allowed foreign telecommunications companies to participate in establishing standards for telecommunications equipment.
- Enhanced protection for U.S. patents and copyrighted software.

These measures — and other concessions expected in the electronics and medical equipment/pharmaceuticals industries — have been greeted coolly so far by U.S. legislators, who have called them unspecific and meaningless. Much more progress must be made much more quickly, they said.

The American telecommunications industry, which experienced a trade deficit of about $2 billion with Japan last year, does not appear to have found much solace in Japan's moves. Japan's pledge to open up its domestic markets generally received mixed reviews from U.S. trade associations representing high-technology companies [CW, April 15].

But cautious optimism remains. "Clearly," one industry representative said, "you can't change an entrenched system overnight."



'Logic bomb squad! Logic bomb squad!'

LETTER

Programmers work as problem solvers

Lowell Jay Arthur's proposed metrics for program quality and programmer productivity that he expressed in a recent interview [CW, April 1] are out of step with the role of the programmer in the 1980s.

Quantitative measures of program size and complexity might have helped in evaluating the efforts of coders. Today's programmer, however, is more a problem solver than just a technician grinding out program statements from painfully detailed "specifications." The organizations that have had the greatest success in raising the levels of quality and productivity are those in which the programmer's problem-solving function is recognized and nurtured.

If there was ever a need for the pure coder, the widespread acceptance of structured disciplines in the 1970s certainly put an end to it. An organization that follows sound practice in all phases of program development need not fear losing control of a project during coding and testing or getting stuck with a new maintenance nightmare. In the 1980s, the growing availability and acceptance of higher level tools such as fourth-generation languages are continuing the trend toward a more responsible, solution-oriented role for the professional programmer.

We must encourage and reward the avoidance of large, complex programming efforts. Our programmers should exercise their ingenuity in solving users' problems quickly and by simply using the appropriate tools and techniques. Once they develop a solution, they must not rebuild it from

See LETTER page 38

COMPUTERWORLD

Donald E. Fagan
Publisher

Editor
John C. Whitmarsh

Executive Editor
Rita Shoor

Managing Editor
Bill Laberis

Asst. Managing Editor
Donovan White

Senior Editors:
Software
John Gallant
Microcomputers
Eric Bender
Communications
John Dix
Systems
Tom Henkel
Industry
Peter Bartolik
Features
George Harrar
Design Editor
Marjorie Magowan
Asst. Design Editor
Mitchell J. Hayes
Special Projects Editor
James Connolly
Update Editor
Glenn Rifkin
Director - International News Services
Susan Blakeney

Asst. Features Editor
Elizabeth Morse
Special Reports Editor
Janet Fiderio
Asst. Special Reports Editor
Becky Batcha
Senior Writers:
Paul Korzeniowski
Edward Warner
Staff Writers:
John Desmond
Maura McEnaney
Donna Raimondi
Clinton Wilder
Correspondents:
New York
Correspondent:
Charles Babcock
Paramus Plaza I
140 Route 17 N.
Paramus, N.J. 07652
201/967-1350
Washington, D.C.
Senior Correspondent:
Bryan Wilkins

Correspondent: Mitch Betts
1273 National Press Bldg.
529 14th St., N.W.,
Washington, D.C. 20045
202/347-6718
West Coast
Bureau Chief: Jeffry Beeler
Correspondents:
Kathleen Burton
Kathleen Sullivan
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8064
Chief Copy Editor
Charlotte Ziems
Asst. Chief Copy Editor
Lory Zottola
Copy Editors:
Christine Casatelli
Deborah Fickling
Patricia Heal
Penny Janzen
Kelly Shea
Joseph Stalvey
Barbara Sutton
Kimberly Valloch

Asst. to the Editor
June Fettig
Editorial Assistants:
Lorraine Brien
Patricia Faherty
Nancy Shannon
Cheryl Tynan
Contributors
Human Connection
Jack Stone
Turnaround Time
Larry Long
Microcomputers
Thomas Madron
The Data Center
John P. Murray
Lecht on Science
Charles P. Lecht
Management Matrix
Walter F. Cuirle
Wohl Street Minijournal
Amy Wohl
Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld Focus
Ann Dooley,
Editorial Director

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina;* Asia's *The Asian Computerworld;* Australia's *Computerworld Australia, Australian PC World, Macworld* and *Directories;* Brazil's *DataNews* and *MicroMundo;* China's *China Computerworld;* Denmark's *Computerworld/Danmark, PC World* and *Run (Commodore);* Finland's *Mikro;* France's *Le Monde Informatique, Golden (Apple), OPC (IBM)* and *Distributique;* Germany's *Computerwoche, Microcomputerwelt, PC Welt, SoftwareMarkt, CW Edition/Seminar, Computer Business, Run* and *Apple's;* Italy's *Computerworld Italia* and *PC Magazine;* Japan's *Computerworld Japan;* Mexico's *Computerworld/Mexico* and *CompuMundo;* The Netherland's *Computerworld Benelux* and *PC World Benelux;* Norway's *Computerworld Norge, PC World* and *Run (Commodore);* Saudi Arabia's *Saudi Computerworld;* Spain's *Computerworld Espana, Microsistemas/PC World, Commodore World;* Sweden's *ComputerSweden, Mikrodatorn,* and *Svenska PC;* the UK's *Computer Management, Computer News, PC Business World,* and *Computer Business Europe;* Venezuela's *Computerworld Venezuela;* the U.S. *Computerworld, Hot CoCo, inCider, Infoworld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine, 80 Micro, Focus Publications* and *On Communications.*

VIEWPOINT

Robot pipes technology into the beaux arts



LECHT ON SCIENCE
Charles P. Lecht

He was poised before a triple-keyboarded organ when I first saw him. It was late afternoon and rays from the setting sun streamed into the performace hall through its 50-ft windows, causing his stainless steel parts to sparkle and glisten. He sat motionless, surrounded by the equipment needed to energize the organ and he himself. Around the power supplies, synthesizers, speakers and other components was a railing. Behind the railing a large audience gathered — many of whom whispered words of disbelief at what they were witnessing.

Except for his generally human shape, no attempt was made to employ the customary, expected cosmetics to deceive the eye to make us believe robots are real persons. Before his performance was over, all in attendance had come to believe that a living soul might inhabit the wired network and metal frame called "Wasubot."

Wasubot is a Japanese-made robot. When I saw him perform at the Japanese Government Pavilion at Expo '85, the science exposition currently being held in Tsukuba, Japan [CW, March 4], Wasubot actually read and played organ music. The video lens eye on his head was fixed to gaze at the sheet music set on a stand above the organ in the traditional manner. He stared at the music as a child might during a school performance — a child who had just learned to play and was determined to give a flawless recital.

Wasubot's head — essentially a featureless metal case about the size of a lunch box — was bolted to a neck of steel by cable and rigidly affixed to his incredible torso. His upper and lower arms — independently suspended steel rods welded to ratcheted gears and wheels — were capable of the kind of forward, backward and lateral motions needed to play the organ. These mechanisms provided Wasubot the requisite position shifts and the strength to hold a particular position while his steel hands — with ball joints and socketed finger rods — gently tapped the organ's keyboard.

His right foot rested on the sound-dampening pedal far to the rear of his organ's console, and the left fell directly to the bass octave pedals. The latter foot was skewed to the right in a position you'd would expect from an organist who was about to sound an impossibly deep bass (the sound you might hear in a cathedral at the opening or closing of a fugue).

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Emulating motions of man when he is engaged in purely artistic pursuits (like playing the organ) is, relatively speaking, new. Wasubot provides us with hope that more such robot uses may be in the making.

Although most of Wasubot's parts were contained within his 8-ft frame, a great deal of his cabling hung or was strung outside of him. The mechanical veins and arteries that flowed from the back of his metal cranium sent signals to his legs, feet, arms, hands and fingers. His fingers were longer than needed, so that when he moved, they resembled an ever-changing cage of cabling groups fastened at his joints.

Robotized repertoire

For Wasubot's performace, bright spotlights were placed behind and above his shoulders. Their beams were trained upon his sheet music so that his eye could discern the notes and so that his processor could perform the pattern recognition unhampered by variations in natural lighting or those from the flashes of the crowd's cameras.

A Japanese girl placed sheet music on the stand before Wasubot — music in the same form known and played by organists throughout the world. She greeted Wasubot, who responded with a synthesized, "Good afternoon," followed by an announcement of his intention to play the piece before him. He had already read the entire score, shipped it to his memory, processed it and stored the pattern of play in an output buffer. (Thus he "learned" the musical piece faster than any human being could.)

His hands and feet slowly slid to assume their sitting position. His fingers deftly maneuvered across the keyboard and organ music began to fill the hall. The audience was dumbfounded: He was not only playing the music, but his body parts were responding to the melody, as we might expect a human's body to respond. The observers' camera flashes came to an abrupt halt, as if they were feeling the same shame they might in any concert hall.

Awkward clapping began when Wasubot finished his piece. Although the applause was brief and those doing it felt a bit foolish, everyone agreed that something very special had occurred.

So what's so special?

A robot that reads and plays music is significant enough to evoke such awe, but we've heard better performances. Wasubot's robotic movements were a marvel, but other recent robotic feats like assembling cars or delivering mail have impressed us as much. So what's so special about Wasubot?

Wasubot was used to create art. Compare the use of robotics for industrial purposes with use purely for artistic value. Emulation of the motions of the human body in the former category goes as far back as we care to consider — the battering ram and the loom provide us with example enough. But emulating motions of man when he is engaged in purely artistic pursuits (like playing the organ) is, relatively speaking, new.

Wasubot provides us with hope that more such robot uses may be in the making. We cannot underestimate the value of robotics to help us off-load the often dehumanizing but necessary processes we must execute to survive. But survival isn't everything. The use of robotics in artistic expression provides us with a powerful new means to further obtain its humanizing benefits.

Earning a 'good company' status staves off user piracy



READER'S PLATFORM
Gary Nored

Pirates have been with us for centuries. But only recently have many people been given the opportunity to try it out for themselves. Most of these 20th-century pirates are basically good people who rationalize their activities by telling themselves that most software companies are not "good" companies.

If you can convince the public that you're a "good" company, the public will not steal from you. Because a large part of being a "good" company lies in responding to consumer complaints, the following list of complaints stands here for the industry's consideration.

■ Most buyers consider software too expensive. Part of that feeling is intuitive, but part of it is based on historial expectations. Consumers expect new products to cost more — but they also expect prices to drop rapidly as products become established. When popular software packages do not decline in price until competitive products force them to, buyers get the feeling that the producers are greedy and deserve to be ripped off.

Software publishers could reduce prices. According to figures in the book *Future Forces: An Association Executive's Guide to a Decade of Change and Choice* (American Society of Association Executives, Washington, D.C.) by Gregg Edwards and David Pearce Snyder, fewer than 5% of software firms use the productivity development technology available to them 15 years ago and less than 5% of that group has introduced anything new.

In addition, advertising expenditures have risen dramatically, and probably excessively, since the spectacular success of Lotus Development Corp. But large advertising budgets are an arguable path to success. Numerous software firms have done quite well on limited or nonexistent advertising budgets. At the very least, these budgets should get scrutinized more closely than they apparently do.

■ Software consumers would like more variety within given product lines. After all, some buyers are penny conscious; others are less concerned about prices. Software publishers could and should offer more of a choice in products and not just more products from which to choose.

For example, by offering budget-conscious buyers simple models of popular packages and selling additional power, user-friendly interfaces or other convenience features separately, producers could give customers more of a choice. This would result in a wider audience for any given product and happier buyers. Happy buyers would be less likely to give away the products of companies with which they are pleased and to whom they feel a sense of loyalty.

■ Buyers want better documentation, but they aren't getting it. For example, two popular microcomputer products come with manuals in which the tutorial and reference functions are inexplicably combined. Can it be that the publishers simply don't know how badly that practice works, or are they just trying to cut corners? No matter. Buyers want bet-

See **PIRACY** page 38

Nored is a software consultant based in Austin, Texas.

Fewer than 5% of software firms use the productivity development technology available to them 15 years ago and less than 5% of that group has introduced anything new.

VIEWPOINT

PIRACY from page 37

ter instructions and it should be easy to accommodate them. Besides, documentation is a wonderful investment — it adds value to a product, makes owning original copies more desirable than owning illegal copies, costs little to produce and is almost impossible to pirate.

■ Customers hate copy protection. The 1978 U.S. Copyright Act specifically gives the purchaser of a copyrighted work the right to use it as he or she wishes, and the buying public knows this. Despite protestations to the contrary, users know that copy protection doesn't work, and manufacturers that use it make them mad. Smart software publishers are beginning to get the message. It is hoped that others will catch up soon.

■ Software buyers believe that software companies are too restrictive in their licensing. Users tend to view software products in much the same way as they view other intellectual properties; they think that any "single-thread" usage should be acceptable, and it is unlikely that they will change their minds soon.

The attitude of "one copy, one user, one machine" is unrealistic and unworkable; it contributes to public perceptions that software companies are avaricious. It is psychologically easier to steal from "avaricious" companies than from "good" ones.

■ Businesses believe that much more liberal provisions should be made for site licenses. In the real world, expensive intellectual properties must be shared among employees in much the same way other costly resources are shared. Software developers should recognize and attempt to meet that need as well. Perhaps by selling first copies with aggressively priced site licenses, software companies could derive real revenue from copies that are currently being made illegally. Industry precedents suggest that most companies may be relied upon to stay honest — as long as it is not too expensive or inconvenient for them to do so.

These are the basic complaints. Software developers who work to resolve them will earn themselves goodwill as well as greater profitability. The much-talked-about industry shakeout will surely take care of the rest. ‡



LETTER from page 36

scratch for every similar problem. In a modern professional environment, measurements oriented to highly repetitive coding tasks are at best irrelevant and at worst harmful.

Arthur is right, of course, in asserting that we have to evaluate both the quality of the end product and the productivity of the problem-solving process. Rather than counting the IFs and the PERFORMs, however, we need to assess the effectiveness and the timeliness of the problem solution. Rather than counting the number of modules and the number of statements in each module, we should try to determine whether a given module performs a well-defined function, whether its scope is too specific or too general and perhaps whether it was needed at all. Rather than counting the GOTO statements or the ratio of comments to code, we ought to assess a program's clarity, its lack of unnecessary repetition or redundancy and its subordination of detail.

Although some of the things we'll have to measure are hard to quantify and harder to automate, they all can be evaluated in a straightforward way by knowledgeable professionals. Because the effort required to perform these evaluations is small in comparison with the programming effort, the cost of making the evaluations, even if primarily done manually, will be repaid many times over by the benefits.

Conrad Weisert
Chicago



"To liven up the party George brought along his personal computer!"

SOFTWARE & SERVICES

Magec works program trick

By Maura McEnaney
CW Staff

DALLAS — Dissatisfied with the applications development tool in use at Natural Resource Management Corp. (NRM) here, Theodore Pohrte decided to try a little magic.

As vice-president of systems operations for the oil and gas investment company, Pohrte has been monitoring NRM's conversion to Al Lee & Associates, Inc.'s Mask and Application Generator and Environment Controller (Magec). NRM's management decided to switch to Magec after the company discovered the applications development product it had been using was not really what it needed.

Two years ago, NRM began using Martin Marietta Data Systems, Inc.'s UFO to develop on-line applications for a newly installed IBM 4341 Group II mainframe running MVS, according to Grover Sherlin, manager of revenue applications. Sherlin's department hoped to use UFO to develop programs to update master files of oil properties and purchases.

But generating UFO transactions for on-line file maintenance of the batch-entry revenue accounting package "took quite a bit of time," Sherlin said. "We

See **MAGEC** page 46

Dispatches from front: MSA link users speak

By John Desmond
CW Staff

In December 1982, Management Science America, Inc. (MSA) was reportedly the first mainframe software vendor to enter the micro-mainframe link market when it announced its Peachlink product [CW, Dec. 26, 1983].



Since then, MSA has sold off most of its failing Peachtree Software, Inc. acquisition and Peachlink has been given a new name — Expert Link. *Computerworld* talked to two of the approximately 300 customers that MSA said have purchased Expert Link, which runs on the IBM Personal Computer and provides a communications link to MSA's mainframe applications.

Richard Peirce, manager of financial systems corporate accounting for Life Investors, Inc., an insurance holding company and investment firm in Cedar Rapids, Iowa, said the firm bought Expert Link 16 months ago when the product was called Peachlink. Peachlink was then sold as part of MSA's Executive Peachpack micro software, which the company no longer markets.

Life Investors runs an IBM 3033 mainframe under OS with IBM's CICS teleprocessing monitor, under which the Expert Link user functions operate. The company is using Expert Link to download data from MSA's general ledger system to only one IBM Personal Computer, a limitation imposed while the link is being assessed, Peirce said.

Peirce said Life Investors encountered a problem with CICS being tied up whenever data was downloaded from Release 21.7 of MSA's general ledger package. The problem slowed the system down and, in a few cases, even caused it to crash. Systems programmers would occasionally have to be canceled off the system until CICS

See **EXPERT** page 45

■ RM/Cobol for IBM's System/36 under SSP is out from Ryan-McFarland/**40**

■ Gould Semiconductor, Mentor Graphics announce gate array design software/**40**

■ System Software Associates enhances its applications for IBM System/38 and 36/**42**

INSIDE

Systems Software/**41**

Too many tools spoil center

SOFTLINE
Steven Pfrenzinger

If you're looking for a productivity tool for the development center, you don't have to look far. The market is full of vendors and products claiming to have the answers to increased productivity for developing production applications within, or under the influence of, the development center. Although the products may provide some of the answers, their proliferation within the development center would quickly limit its effectiveness, as has happened in the information center.

The numerous challenges of selecting programmer-oriented productivity tools for the development center are different from those faced by the user-oriented information center. Information center management had to select tools that would be effective in building ad hoc and quasi-production applications. Its decisions often resulted in the selection — and proliferation — of numerous end-user tools.

Why was it necessary to buy so many tools? The answer was simple: Each tool provided a different, specialized function, and numerous functions were required. None of the products could deliver all the required functions and features neces-

See **TOOL** page 44

Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based consulting firm that specializes in IBM's IMS DB/DC and CICS/DL/1. He has 15 years of data processing experience and is a regular contributor to Softline.

Software AG adds E-mail, other aids

RESTON, Va. — Software AG Systems, Inc. has announced Mail/Connection electronic mail software for use with its Adabas data base management system.

The company also announced the Adabas Continuous Processing Option (CPO), a version of Adabas designed to deliver 24-hour data base availability, and Review, a resource tracking and auditing system for Adabas and Software AG's Com-Plete transaction processing system.

According to a spokesman, Mail/Connection is said to provide storage and retrieval capabilities for messages through integration with Adabas. Features of Mail/Connection include program function key orientation, full screen editor and micro-mainframe link. Using Software AG's Natural/Connection micro-mainframe link, users can now send and receive electronic mail messages through personal computers.

Mail/Connection can be accessed through IBM 3270-type terminals or IBM and compatible microcomputers using Natural/Connection. Mail/Connection is priced at $10,000 for IBM's DOS operating system, $15,000 for VS1 and VM and $20,000 for MVS.

See **MAIL** page 46

BIM Spotlight



Wouldn't it be nice to have a couple more terminals on your desk?

You could eliminate the inconvenience, lost productivity, and system overhead associated with logging off and on to different applications!

BIMWNDOW permits multiple terminal sessions to be active concurrently at the same physical 3270 CRT, under **DOS** or **OS** VTAM. The user may switch back and forth **instantly** between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different VTAM-connected partitions/regions. For example, one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a test CICS to test the application program being developed.

Call for full documentation or **free 30-day trial.**

Price: OS — **$3600** or $180/mo., DOS — $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

BIM
B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 297 893 (BIM UR)
Member Independent Computer Consultants Assn

Gould, Mentor Graphics unveil gate array software

SANTA CLARA, Calif. — Gould AMI Semiconductors, a division of Gould, Inc., and Mentor Graphics Corp. have jointly announced a software product that is said to allow systems engineers to complete a gate array design process — from schematic entry through simulation and physical layout — using a workstation in their own environment.

Using Mentor Graphics' Gate Station, systems engineers use Gould AMI macro libraries to design gate arrays ranging from 1,000 to 4,000 gates in the 3-micron double-layer metal process. The Mentor Graphics software coupled with the Gould libraries allow schematic capture, logic simulation, automatic physical layout and back annotation and verification during the design process. The information is then sent on to Gould for fabrication, a spokesman said.

The software from Mentor Graphics includes modules for schematic entry, simulation, automatic physical layout and add-delay function. The prices range from $12,000 to $65,000 for the entire package depending upon host. The software runs on Apollo Computer, Inc. workstations ranging from the DN300 to the DN660, under Apollo's Aegis operating system.

The Gould libraries cost $600. More information on the entire system is available from Gould AMI, 3800 Homestead Road, Santa Clara, Calif. 95051.

One DBMS runs perfectly on MicroVAX and 8600

System 1032® does everything on every VAX. Every command you use on your VAX 8600 works exactly the same on your MicroVAX I. Exactly the same.

Call collect for immediate information:

(617) 661-9440 ext. 1032

Software House

1105 Massachusetts Avenue, Cambridge, MA 02138

CW485

One DBMS fully supports VAXclusters

System 1032® shares data among every CPU in your VAXcluster. Using the VAX Distributed Lock Manager, all cluster features are completely transparent to the user.

Call collect for immediate information:

(617) 661-9440 ext. 1032

Software House

1105 Massachusetts Avenue, Cambridge, MA 02138

CW485

System/36 gets RM/Cobol

Supports native SSP, IBM RPG data files

ROLLING HILLS ESTATES, Calif. — Ryan-McFarland Corp. has announced that its RM/Cobol programming language is now available for IBM's System/36 Models 5360 and 5362 under SSP, the minicomputer's native operating system.

The System/36 implementation runs under the most recent release of SSP and on earlier versions. According to a Ryan-McFarland spokesman, the implementation supports SSP data files, so that files created by System/36 utility programs and by other languages on the computer such as RPG can be used in RM/Cobol applications.

RM/Cobol file I/O is said to be efficient because SSP file handling features are built into the System/36. The spokesman said an RM/Cobol benchmark program executes nearly twice as fast on the System/36 as it does on the IBM Personal Computer AT and three times as fast as on the Personal Computer XT.

Through an arrangement with IBM, the System/36 implementation of RM/Cobol will be manufactured, supported and marketed by IBM, the vendor spokesman explained. Licensed applications developers can obtain development systems and runtime integration rights from Ryan-McFarland.

Cross-compilation

In addition to the System/36, IBM processors that run RM/Cobol include the 4300, 3030 and 3080 mainframes under VM/CMS, the Series 1 under AT&T's Unix and the Personal Computer under IBM's PC-DOS and Digital Research, Inc.'s CP/M 86. RM/Cobol-based software can be cross-compiled in any of those environments for use in any other, the spokesman said.

The System/36 RM/Cobol compiler and runtime module is priced at $1,900, and the runtime component alone is priced at $400. The products are scheduled to be available in June, the spokesman said.

Ryan-McFarland is located at 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

Data Kinetics releases DBMS with automatic table handling

OTTAWA — Data Kinetics Ltd. has announced a data base management system with an automatic table handling system for IBM mainframes running MVS and DOS operating systems.

Operating independently of application programs, the Tablebase DBMS stores data in a central library of tables outside the programs, a spokesman said. When changes occur, new entries are input only to those tables affected. Users reportedly can create, access and maintain tables on-line, independent of the programs that use them.

Different tables may be stored in the same library, and table updating can occur while multiple reads are taking place.

Tablebase components include an end-user environment that provides table definition and maintenance for CICS and IBM's Interactive System Productivity Facility, a batch facility and an access facility.

The product can be used with most commercial programming languages, including Cobol, Fortran and PL/I.

The product costs $25,000 for MVS and $15,000 for DOS.

Data Kinetics is located at 97 Norman St., Ottawa, K1S 35K, Ont., Canada.

Fischer-Innis announces version of productivity aid for TSO users

NAPLES, Fla. — Fischer-Innis Systems Corp. has announced Release 5.0 of its Interactive Output Facility (IOF), a productivity aid for use in IBM JES2 TSO environments.

Release 5.0 enhances users' ability to manage JES2 output under MVS/TSO, a vendor spokesman said. The IOF's display panel reportedly allows users to review JES2 batch jobs and their output.

IOF Release 5.0 is said to allow TSO users to select jobs for review based on an expanded list of criteria, including input and output class, destination, forms and writer name.

Both input and output job characteristics can be modified on the IOF panel, the spokesman said. An added panel is said to display input queue statistics, including queue length, job class and priority. Another panel allows for easier definition of data sets for snapshot output, in which a selected portion of data is extracted so it can be printed without affecting the original job.

Release 5.0 increases the number of Interactive System Productivity Facility (ISPF) variables saved for each user in the ISPF profile, the spokesman said.

Stored variables are said to include scrolling options, condense and compress specifications and default IOF job selection criteria. For snapshot and print data sets, users reportedly may save programmer name and JES2 line count. Additional job access routines enable systems managers to specify who may use certain IOF facilities.

IOF Release 5.0 is available for a monthly lease fee of $250.

Fischer-Innis is located at 4175 Merchantile Ave., Naples, Fla. 33942.

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

■ **MacKinney Systems has announced CICS/CICS Enhanced Master Terminal (CICS/CEMT) for IBM's MVS. The product was previously available only for IBM's DOS.**

The MVS version of CICS/CEMT reportedly provides for the allocation of files to IBM's CICS from a batch partition. It also provides verification that the function was successful. Other product functions allow the user to start a task at any CICS terminal or run a CICS program from a batch job and issue a NEWCOPY command to CICS automatically after successful completion of a program.

CICS/CEMT also allows CEMT commands to be passed to a CICS system running on another CPU or virtual machine. The product reportedly allows up to five CICS systems to be defined.

CICS/CEMT is priced at $495 for a perpetual license and $195 for an annual license.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804.

■ **Davis, Thomas and Associates, Inc. has announced DTAICCF, which allows users of IBM's ICCF to run a CICS transaction while logged on to ICCF. The software runs in IBM OS environments.**

A spokesman said DTAICCF can be used in the command mode or full-screen editor mode of ICCF without disrupting current ICCF activity to run CICS transactions external to ICCF.

DTAICCF is priced at $1,800, plus $225 per year for maintenance after the first year. Lease price is $90 per month.

Davis, Thomas and Associates, Suite 301, 8800 Highway 7, Minneapolis, Minn. 55426.

■ **Candle Corp. has announced CL/Menu, an applications menu facility that replaces traditional IBM Vtam screens with menus. CL/Menu runs under IBM's MVS and MVS/XA operating systems.**

According to a spokesman, CL/Menu replaces the traditional "Welcome to Our Network" screen with a menu showing available applications

Continued on page 42

RAMIS II Seminars

Eastern US	
Albany, NY	May 7
Atlantic City, NJ	April 23
Baltimore, MD	April 24
	May 21
Boston, MA	April 23
	June 5
Greensboro, NC	April 25
Harrisburg, PA	May 30
Hartford, CT	May 1
King of Prussia, PA	May 23
McLean, VA	May 9
Miami, FL	May 8
New York City, NY	June 12
Philadelphia, PA	May 14
Pittsburgh, PA	May 16
Princeton, NJ	June 4
Raleigh, NC	May 15
Central US	
Chicago, IL	April 25
	May 7
	June 4
Dallas, TX	May 23
Houston, TX	May 14
	June 11
Milwaukee, WI	April 23
St. Louis, MO	May 24
Western US	
Costa Mesa, CA	April 24
Los Angeles, CA	May 22
	June 5
Portland, OR	May 16
San Diego, CA	April 23
San Francisco, CA	May 21
Scottsdale, AZ	May 8
Seattle, WA	May 14
Sherman Oaks, CA	May 15
Denver, CO	June 6



Give your Information Center users freedom of choice.

RAMIS II is the comprehensive software system that makes your Information Center work . . . for everyone. It meets the needs of both end user and computer specialist, allowing each to be significantly more productive.

The key is *freedom of choice.* For instance, end users have not one, but *three* ways to produce reports (depending on their computer expertise and preferences). Intelligent menus for the novice; everyday English at the executive level; and a powerful fourth-generation language for the experienced user.

But this is just the beginning.

RAMIS II provides additional choices for data access, graphics, statistics, PC integration and more.

And, the choices RAMIS II offers do not stop with end users. Your Information Center staff may select their own options in education and training, user assistance, and data security.

RAMIS II can also help you break your production applications logjam. Our screen painting, relational capabilities, and new data management language increase programmer productivity as never before. And a new *compiled* System Building Executive meets the performance and response time criteria of the most demanding users.

Learn more about the power and flexibility of RAMIS II at a free seminar near you. Plan to join us for 'Freedom of Choice For Your Information Center' in the morning, or an afternoon session on 'Breaking the Applications Logjam.' Or, if you prefer, register for both seminars and be our guest for lunch. By attending, you'll discover RAMIS II's significant productivity advantage.

These seminars are free and specifically tailored to data processing and business professionals whose companies have IBM mainframe or PC equipment. To attend one or both, just return the coupon or call 1-800-257-5175 for reservations.

RAMIS® II... THE LEADER BY DESIGN

MATHEMATICA
P.O. Box 2392, Princeton, NJ 08540
1-800-257-5175

Register me for your seminar(s) in

_____ on _____
(City) (Date)

☐ Applications Dev ☐ Info Center ☐ Both
☐ Send me more information on RAMIS II

Name _____
Position _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Computer _____ Operating System _____

MATHEMATICA
MARTIN MARIETTA

SSA unwraps enhanced BPCS for IBM System/38, 36

CHICAGO — System Software Associates, Inc. (SSA) has announced enhancements to its software packages for manufacturing, distribution and financial applications on the IBM System/38 and System/36.

Business Planning and Control System (BPCS) 38 Version 2 for the System/38 has enhancements for production planning control environments, a spokesman said. Version 2 supports order entry, planning and control and customer shipment. Among new functions are planning bills of material, order entry features and options, two-level master production scheduling and final assembly scheduling.

BPCS 38 Version 2 is written in RPG-III and reportedly uses all data base and productivity features of System/38. Prices for BPCS Version 2 start at $52,000.

SSA also announced BPCS 36 Advanced Manufacturing Software for the System/36, with enhanced functions for the manufacturing environment, similar to those offered by the BPCS 38 Version 2.

BPCS is written in native System/36 mode, RPG-II, and is said to use all data base and productivity features of System/36. Prices for BPCS 36 Advanced Manufacturing Software start at $25,000.

SSA also announced BPCS 36 Process Industries, Version 2 software for the System/36, with enhancements to the areas of product cost and lot control.

BPCS Version 2 now allows up to nine user-defined cost fields for each item for tracking production costs in quality control, quarantine, fixed and variable overhead and specialized use of material.

The feature is intended to address all product costing and analysis needs of process industries such as pharmaceuticals, chemicals and food processing.

BPCS 36 Process Industries Version 2 includes expanded capacity permitting allocation of product lots to customer orders on the finished-goods level, and allocation of raw material to orders on the manufacturing level.

BPCS 36 Process Industries Version 2 is written in native System/36 mode; prices start at $25,000.

System Software Associates is located at 200 W. Madison, Chicago, Ill. 60606.

15 years ago we made a promise to you. We've kept it 32 times.

1970. The original Spectron* data line monitor, the D-2000. First on the market.
1972. Communication Switch Units; various EIA switches.
1973. EIA Interface Patch Units.
1974. D-601, the original Spectron DATASCOPE.* First in a series of CRT line monitors.
Telephone Line Patch, TLP-8.
Modem Eliminators.
1975. High Speed Recorder.
Alarm Panel.
1976. Programmable Monitor with Data Trap, D-501.
Enhanced high-speed Data Recorder, T-511.
DPU-24XX. Industry's first Digital Patch Units to use printed circuit cards.
1977. Industry's first programmable monitor, D-502; allows emulation.
DSP-24XX. Digital Switch Patch series. Industry's first to integrate switching and patching.
DSU-24XX. Digital Switch Unit series.
1978. Line Recorder Printer, D-201.
Digital Tape Unit for DATASCOPEs, T-96.
Large Electronic Buffer, D-301.
Analog Patch Units, APU-829.
Modem Interface Splitter, MIS-3400.
1979. Modem Eliminator Repeater.
The D-560 family of Spectron DATASCOPEs.
D-901 DATASCOPE. Industry's most powerful diagnostic tool.
1980. RASP. Remote Access Switch/Patch. Introduced the concept of centralized control of a data network.
1982. DPU-24. Economical Digital Patch Unit.
D-101. Economical, truly portable DATASCOPE with high performance.
1983. D-101x. Added bit level protocol to D-101.
NMS. Industry's first comprehensive Network Management System.
1984. D-105. Enhanced portable Spectron DATASCOPE with SNA decode capability.
NMS. Elemental database—OPEN World.
1985. NMS. IBM host interface.
NMS. Interface to other matrix switches.
NMS. RASP support.
•
•
•
One good idea after another.

Our promise with Spectron data communications products has been to always deliver what you need, when you need it.

Over the last 15 years, that kind of promise has meant coming out with entirely new products. Or, evolving one design from another.

It's a commitment that's built the entire Spectron* line of diagnostic, tech control and network management products into comprehensive data communications solutions that reduce downtime, provide the modularity for a growing data network, and offer the continuity and compatibility a multivendor environment requires.

By now, that commitment has become a Spectron tradition. And it's one we'll uphold. We promise.

For more information on Spectron products, call (800) 328-8800, ext. 489.

nt northern telecom

*Trademark of Northern Telecom © 1985 Northern Telecom

Continued from page 41

and their status. CL/Menu reportedly improves communications by allowing system status to be displayed on the menu. Users are returned to the menu if an application becomes unavailable while in use.

With an electronic bulletin board feature, the data center can notify users of scheduled interruptions in service or other items of interest. CL/Menu is scheduled to be available in the second quarter. The permanent license fee for CL/Menu is $7,500.

Candle, Suite 2404, 10880 Wilshire Blvd., Los Angeles, Calif. 90024.

■ The Cambridge Systems Group, Inc. has announced that its ASM2 Standalone Restore (SAR) facility is now available for IBM's MVS/XA. ASM2 is a disk space management system.

ASM2's Standalone Restore version 3.0.1 is said to be able to restore, in a standalone environment, system volumes that have been lost or damaged. Standalone Restore uses ASM2's full-volume dump/restore facility.

The price for version 3.0.1 of ASM2's SAR facility is $19,500.

Cambridge Systems Group, 24275 Elise, Los Altos Hills, Calif. 94022.

■ Value Software, Inc. has announced Release 11.01 of Vsmanager, formerly known as Data Center Management System, for automating production control activities in a data center. Vsmanager runs under IBM's MVS and MVS/XA operating systems.

Continued on page 45



ONE BIG REASON WHY OVER 800 LARGE NETWORK USERS WORK WITH NCR COMTEN TODAY:

TOMORROW.

Because tomorrow *does come.* Only too soon. That's why more than 800 data communications network users have chosen, and continue to work with, NCR Comten. Our systems anticipate the day *after* tomorrow.

In our long-range planning, we know that growth and change are the only constants with which our customers must deal. As a consequence, we design network systems capable of handling new technologies and services as they emerge. Not only do we help you reduce initial system costs, we also help you preserve that substantial investment when tomorrow dawns.

Planned non-obsolescence is just part of the NCR Comten story. More reasons will be found in our special executive briefing. For details, write "Data Communications Systems", NCR Comten, Inc., Department 8015, 2700 Snelling Ave. N., St. Paul, MN 55113. **Or call 1-800-334-2227. In Canada, call 1-800-543-5713.**

NCR COMTEN. KNOWN BY THE COMPANIES WE KEEP.

NCR

NCR Comten, Inc

TOOL from page 39

sary to meet the information center's needs, such as ad hoc queries and reports, statistical information, spreadsheets, data base extracts and business graphics.

Are we faced with the same dilemma of selecting too many tools for the development center? The answer is no. The requirements for development center productivity tools are such that one or two tools will provide all the functions, features and performance required.

The system must be useful for building performance-oriented, predefined applications built around a data base management system. The format and content of screens and reports are well defined in advance, along with data models and applications logic requirements. These characteristics are obviously different from those in the information center.

Also, the decision to use one tool for a one-time or quasi-production application is less significant than the choice of a development center tool for building a major production application that will be used and maintained for many years.

Restricting use

Development center tools currently available can adequately address 95% of the predefined applications waiting to be built. If a development center can restrict the number of tools in use, it can realize tremendous savings in development, maintenance and training costs. Such a restriction also provides an opportunity for standardization within the production development environment.

The difficult part of selecting a single tool for the development center is recognizing that it is a strategic, long-term decision, not a tactical, short-term one. As a rule in software evaluation, tactical decisions are easier and less risky to make than strategic ones.

A tactical approach would have you buying another tool for every new or different requirement. Experience is proving, however, that the individual benefits of numerous tools are almost always offset by the burden of training, maintenance and support. The architectural differences that often exist between tools are an additional hindrance to systems integration.

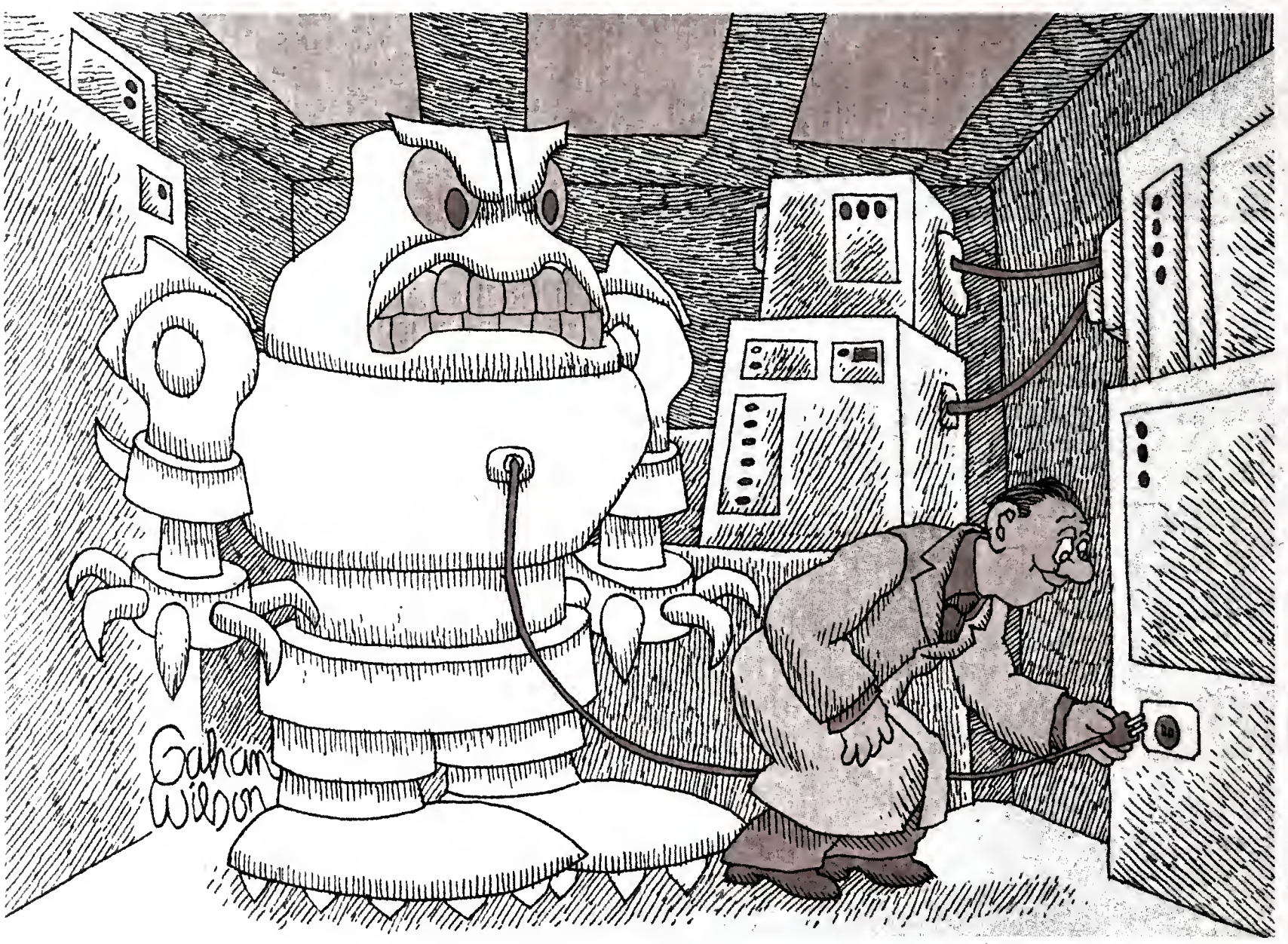
Strategic decision

What is the answer? Make a strategic decision to evaluate and acquire a productivity tool that can be used to build 95% of development center applications. This is the toughest decision because it requires a commitment to select and implement a tool that could affect the entire DP organization.

A major benefit of this wide-ranging impact is that productivity gains can now be realized by the majority of DP personnel within a consistent and manageable framework. The strategic decision requires that the selected productivity tool have the following minimum characteristics:

- Integrated on-line, batch and report writing functions.
- Features usable by multiple skill levels.
- A minimal learning curve.
- A screen image painter to generate the native screen source statements.
- A nonprocedural field-edit logic capability.
- An early prototyping feature usable soon after screen design.
- High-level commands or macros to simplify native data base and data communications interfaces.
- Features ensuring that developers generate standardized source code.
- A facility for leveraging senior developers with a command or macro writing feature for building reusable code.
- No significant design restrictions that limit architectural functions.
- High-performance processing capability.
- An import facility from existing data dictionaries.
- Automatic documentation generation capabilities.
- No runtime package that would affect portability to multiple CPUs.
- An integrated dictionary facility to control screens, reports, programs, data bases and other components.

The benefits to controlling productivity tools within the development center are significant. Take the time to make the strategic decision during selection, and the entire organization will reap the benefits.



Some people just ask for trouble.

Isn't it amazing just how many people go around asking for trouble?

Why, we're willing to bet there are people in your DP department this very minute flirting with disaster.

They're running the risk of a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error bringing the whole kit and caboodle to a screeching halt.

When all they have to do to keep things running smoothly is use our JCLCHECK™ program.

JCLCHECK software catches all JCL errors and provides complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

No more errors — no more troubles. It's that simple. And successful.

Over 400 DP departments now use JCLCHECK software to correct the errors of their ways, and save money at the same time.

To put it in another perspective, we'll send a sales representative out to analyze *your* operation and provide a written statement on exactly how much time and money you're spending on JCL errors. And how much you could be saving with the JCLCHECK package.

Still, some people are destined to find these things out the hard way.

To that we can only add, better them than you.

Yes, I want to stop living dangerously.

☐ Send me details on the JCLCHECK program.

☐ Have a representative call me.

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE ZIP

PHONE OPERATING SYSTEM

Return to: Triangle Software Co., 4340 Stevens Creek Blvd., Suite 275, San Jose, CA 95129, (408) 554-8121.

Triangle Software Company

If you don't ask for us, you could be asking for trouble.

© 1985 Triangle Software Company
JCLCHECK is a trademark of Triangle Software Company.

SOFTWARE & SERVICES

EXPERT from page 39

returned to normal, he said.

Since MSA provided a fix to general ledger Release 21.7, the problem has not recurred, Peirce said. At MSA's Interact users group meeting in New Orleans recently, Peirce said, MSA representatives assured users that Release 21.9 of general ledger, scheduled to be announced this fall, will work more efficiently with Expert Link.

For the future, Peirce said his firm is preparing a project involving the use of micro spreadsheet software to prepare departmental budgets. The budgets would be uploaded to MSA's Easy Plan budgeting tool on the mainframe, which is said to update MSA's general ledger budget master files.

While Peirce said Life Investors is satisfied with Release 4.2 of Expert Link, the company also recently bought a copy of Pansophic Systems, Inc.'s Panlink micro-mainframe link package. An advantage of Panlink, according to Peirce, is its ability to access multiple vendors' mainframe software.

Commercial bank's usage

Fidelity National Bank of Baton Rouge, La., a commercial bank with 19 branches and $750 million in assets, has been using Expert Link for two years.

Susan J. Babin, assistant vice-president and account manager at the bank, said Expert Link has been used to download data to micro spreadsheet software for report generation. The bank ties three IBM Personal Computer XTs to its IBM 4341 mainframe using Expert Link.

Fidelity National is using the link as an aid in budgeting, which Babin described as a nightmare at the bank. Branch managers enter a proposed budget on a diskette, which is forwarded to the accounting department.

If the budget checks out, accounting uploads it to Easy Plan on the mainframe. As a security measure, all uploading and downloading is done by the accounting department.

Link goes down with mainframe

A drawback of Fidelity's link, Babin said, is that when the mainframe goes down, the link goes down. To combat the problem, the bank plans to use Expert Link to download an account cost-center reference file to a micro.

The reference file will be used to validate transactions during the day. At night, the mainframe data base will be updated in batch mode.

The only disadvantage Babin cited of not being on line is the inability to process a new account, but she said most accounts are not opened in one day. An advantage of being off line, she said, is the "freedom from worrying about whether [or not] the mainframe is down."

Since obtaining Expert Link, Fidelity has added four branches and several financial services but has not had to add staff. "We have more to do [but] have taken up the slack with the micros," Babin said.

At the Interact meeting, an MSA spokeswoman said the company will announce a series of distributed personal computer applications to allow reference data bases to be downloaded from MSA mainframe applications to IBM Personal Computers via Expert Link.

Continued from page 42

According to a vendor spokesman, Release 11.01 of Vsmanager includes on-line job tracking across multiple processors and increased data set scheduling and job forecasting capabilities.

The latest release also includes XA support for its JCL Validation feature.

An enhanced Vtam communications feature called Vtam Bridge can be used for on-line job tracking in addition to the normal Vtam communications support.

Vtam Bridge is also said to eliminate the need for a shared Dasd environment, and it supports Vsmanager on up to 20 CPUs.

The data set scheduling feature of Vsmanager can now accommodate up to 600 data sets recorded on the master list.

According to the vendor, the forecasting capabilities of Vsmanager have been enhanced to produce a forecasted schedule of the data center's work load for 2,400 jobs in a 30-day period, 4,800 jobs in a 15-day period or 9,600 jobs in a seven-day period.

Vsmanager, Release 11.01, is priced at $64,000.

Value Software, 498 N. Kings Highway, Cherry Hill, N.J. 08034.

■ **Autovative Computer Extensions, Inc. (ACX) has added support for SAS Institute, Inc.'s SAS/Graph plotter to its ACX-PM Printer Manager for IBM mainframes running under VM.**

According to a vendor spokesman, Graf-ACX Graphics Manager allows SAS/Graph users to share plotters and perform spooling functions. It also allows users to print multiple plots per page.

The product allows continuous- and noncontinuous-feed asynchronous Ascii plotters to be managed by ACX-PM.

With ACX-PM, the plotters are automatically shared by all CMS users without system operator intervention, according to the vendor spokesman.

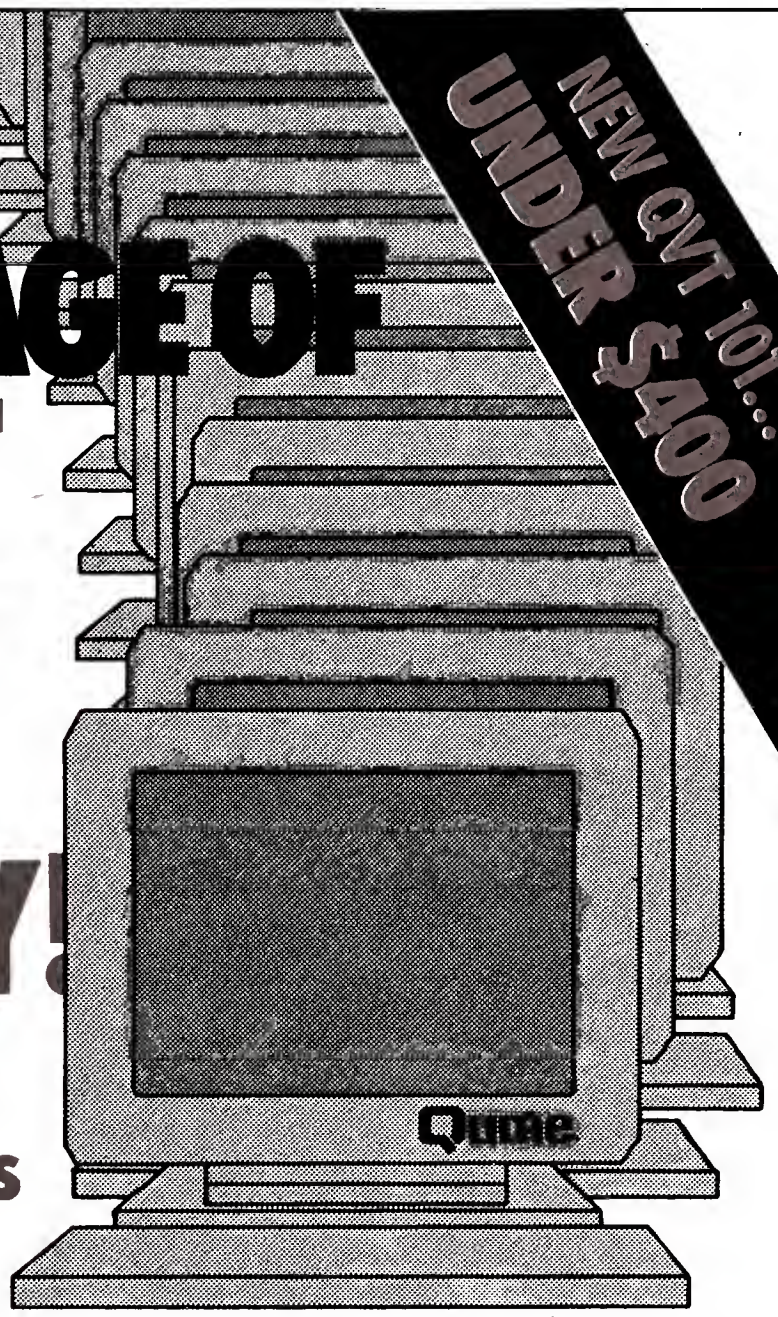
Graf-ACX generates charts, plots and presentation graphics. Plots can be produced from any local, remote or dial-up CMS terminal, the vendor said.

ACX-PM Base Printer Manager sells for $5,000. Graf-ACX sells for $2,000.

Autovative Computer Extensions, 5120 Belmont Road, Downers Grove, Ill. 60515.

TAKE ADVANTAGE OF THE BEST PRICING IN THE COUNTRY!

NEW QVT 101... UNDER $400



Now available on all QUME terminals through PMS.

If you haven't yet taken advantage of PMS's exceptional QUME offering, you are throwing your $$$ away. But it's not too late.

Right now, the best price on QUME terminals in the country is being offered through one value-added distributor . . . PMS. And that's not all, PMS is also promising immediate delivery on these terminals.

To find out how you can take advantage of PMS's exceptional deal, call one of our toll free numbers today!

PMS
Pacific Mountain States
CORPORATION

IN CALIFORNIA
1 (800) 272-3222
OUT-OF-STATE
1 (800) 423-2853
ASK FOR OPERATOR 16

MAIL from page 39

The product is available immediately.

The Adabas/CPO is said to ensure data base resource availability despite peripheral hardware failures. Adabas/CPO automatically detects and recovers from I/O errors, providing transparent read/write access to current backup data in the event primary data becomes inaccessible.

The Review tracking and auditing system can be used to provide billing for use of data base and teleprocessing resources. Review provides facilities for generating the summary, detail and exception reports needed to manage capacity, to account for system usage, to tune for performance and to detect abnormal or unauthorized activities.

Review is supported under IBM's MVS/XA, MVS/370, VS1 and DOS/VSE operating systems. Adabas/CPO is available for MVS/XA, MVS/370 and VS1 environments.

Adabas/CPO is priced at $50,000 for the DOS version, $65,000 for the OS/VS1 version and $80,000 for the MVS version. Review is priced at $10,000 for all environments.

Software AG is located at 11800 Sunrise Valley Drive, Reston, Va. 22091.

MAGEC from page 39

had seven people working for the better part of six months to update a relatively small number of master files.

"To do a simple update to one file [took] our users several days of arguing with the computer," he said. "One person [spent] a week building a transaction to do what I would regard as a fairly straightforward update."

Pohrte realized that what NRM needed was a product that used command-level Cobol and not a proprietary development language. It was his job to inform upper management of the problem.

"One of the most difficult chores was to convince management that what we had was not what we needed," he said. A presentation from Dallas-based Al Lee & Associates gave Pohrte ammunition with which to do the convincing.

When Sherlin met with Al Lee, the vendor firm's president, the pair took a UFO application that a CICS programmer had been struggling with for about a month and brought it on-line with Magec in a day and a half, Sherlin said.

"At the end of that day and a half, we were able to have an inquiry screen which allowed people to at least see in real time what was out on that purchase and sales file," he said.

According to Sherlin, Magec applications are developed on-line through nonprocedural specifications entered on a terminal screen. Magec then generates Cobol inquiry, update and browse functions from the nonprocedural specifications stored in its dictionary.

Applications can be customized by entering Cobol code directly onto the development screen, and they can be modified and regenerated without losing that customization. The product's dictionary-controlled security system governs on-line access.

One important benefit, Sherlin said, was that Magec used the same Cobol copy statement that NRM used on its batch programs. Screen editor features have also helped NRM, he said. "If you define a field and you enter a slash and two characters and another slash and two more characters, Magec assumes that it is a date field."

Sherlin said some 40 UFO applications are slowly being converted to Magec. In addition, all new applications are being written in Magec. "We've used Magec to bring up some quick-and-dirty-type screens within a matter of just three or four hours," he said. Al Lee & Associates also developed an interface to the company's Teradata data base machine.

According to Pohrte, the conversion has helped NRM maximize the productivity of its 15-person programming staff. "We wouldn't have been able to do the same things that we did in Magec with the number of people we have," he said.

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.



$639.

MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201)-828-4499

DON'T LET SHIPPING COSTS BLOW YOU AWAY



ELIMINATES LOST REPORTS



TONE Software Corp.
(714) 991-9460





TIMELY DELIVERY

GIVES YOU CONTROL OF YOUR PRINTERS

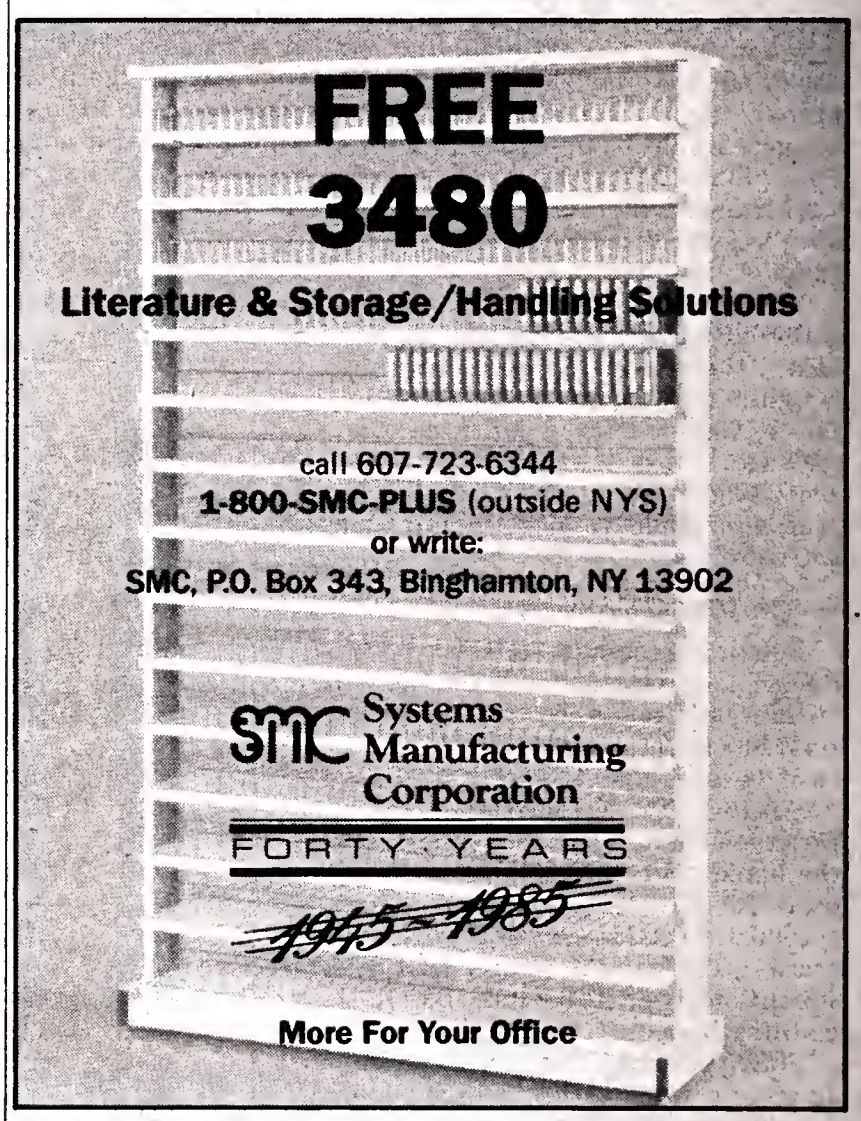
- VS1, MVS, MVS/XA
- JES1, JES2, JES3, BTAM, VTAM
- SECURITY
- LOCAL & REMOTE PRINTERS
- SMF ACCOUNTING RECORDS
- NO SYSTEM MODS
- COMPLETE AUDIT TRAIL
- CHECK POINT RESTART
- AUTO RETRY
- REPLACE DSPRINT WITH SPF PANELS
- NO RESPOOLING OF DATA

TS-PRINT

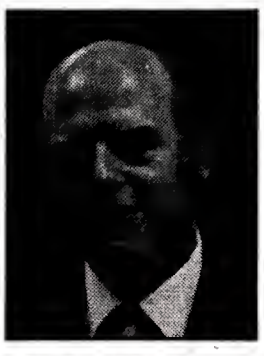
1735 South Brookhurst • Anaheim, CA 92804 • (714) 991-9460 • Telex 181592



"I think we ordered the wrong keyboard."



IBM users confirm DTA software benefits:



"DTA/LMON did more than reclaim 700K virtual storage..."

David Dick, Senior Systems Programmer, Murphy Motor Freight, Inc., St. Paul, Minnesota

"DTA's new monitor program for DOS/VSE satisfied 70% of phase loads from the SDL/SVA."

Customers say it better than we can. Read what other IBM users say about DTA product benefits. Call or write for our customer-endorsed product information kit.

1-800-328-4827, Ext. 1365
LOCAL: (612) 938-7669

DTA

IN DEPTH

Understanding the DP professional

A primer for the wives, husbands, friends and lovers of people who speak computerese

Part 1

By Bruce Kula

Does a decade of nested IFs evoke for you the delicate beauty of a mountain waterfall in late spring? Is there nothing in your life so satisfying as tracing a storage chain through a 300-page dump?

If you answer yes, you may presume you are not an easy person to talk to about computers. If you have spent more than a couple of years in the world of DP, it's likely you have a whole vocabulary that is incomprehensible to someone outside that world.

It is impossible to speak computerese all day, then go home and not speak it at all. Words creep into your vocabulary that used to be out of place outside a computer room. Although some bits of computer language work their way into the common language, (such as the word "computer" itself — thirty years ago the laity called any computer "an IBM"), most DP jargon remains beyond the grasp of people who don't use it constantly. There is simply too much of it.

Even two seasoned programmers can easily confuse each other: An abbreviation like CSA means a vastly different thing to an MVS programmer, a CICS programmer and a VAX programmer whose great-grandfather fought for the Army of the Confederacy.

Programmers marry crane operators, and computer operators drink beer with corporate lawyers. Users have to talk to systems analysts, and data base administrators have to talk to management. It may be that the person closest to you doesn't even have a good idea of what you do for a living, much less understand the joys and tribulations of your work.

On top of this language problem, DP is new enough to be widely misunderstood. People with a slight knowledge of computers have some notion of how prosaic work with computers can be but often lack an appreciation for the remarkable technology involved.

More often, the layman's concept of computers comes from magazine articles with titles like "House of the Future" and "Cars That Think."

There are a few things you can do

The second article in this two-part series will describe days in the lives of several computer professionals.

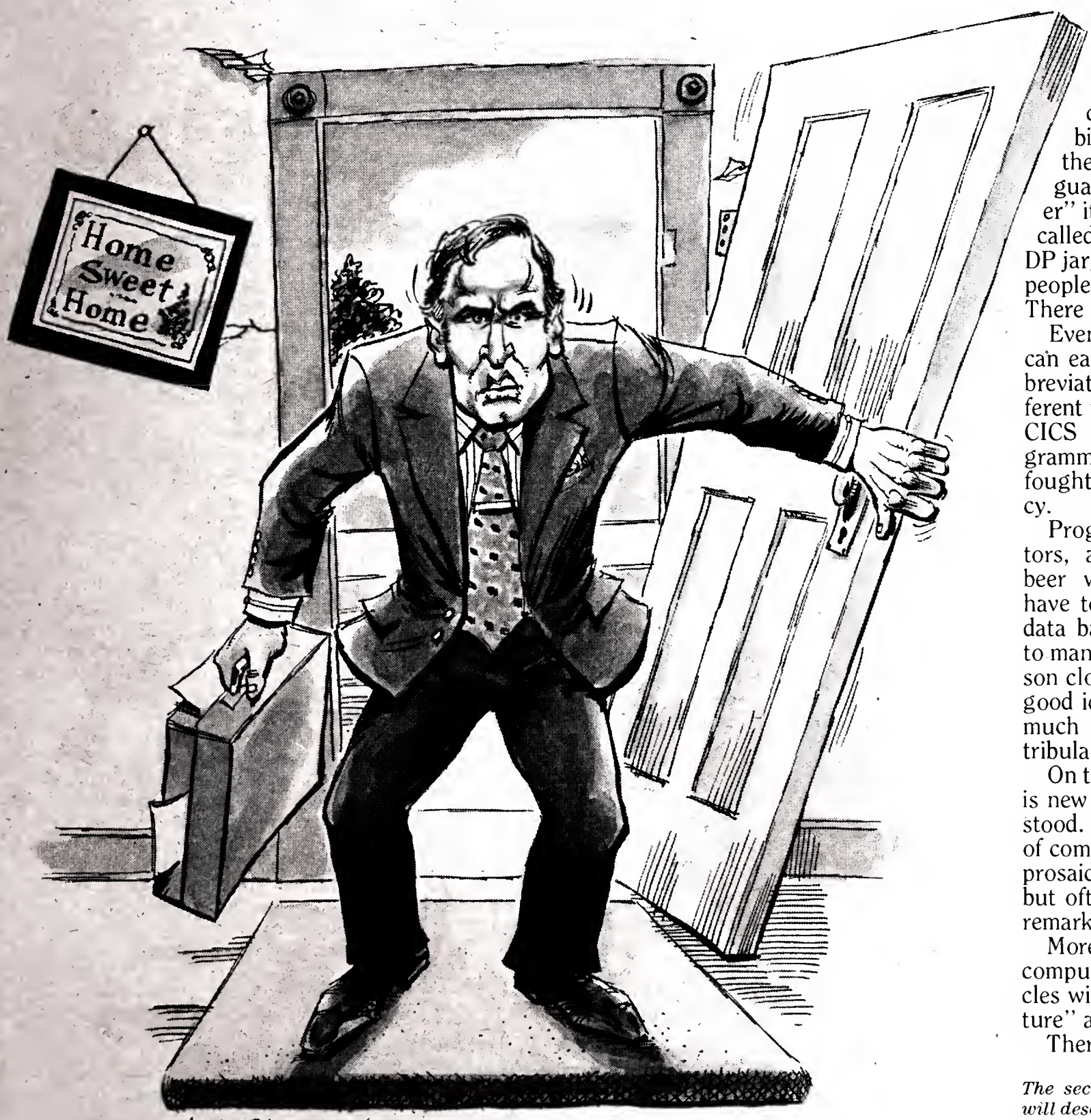


ILLUSTRATION BY JIM VENABLE

INTRODUCING A CLASSY NEW CATALOG FOR PEOPLE WHO THINK IBM, BREATHE IBM AND BUY IBM

IBM 3270 USERS

XPOINT CORPORATION, a nationwide distributor of Micro to Mainframe and Data Communications equipment introduces a new catalog, **"THE XPOINT BLUE BOOK™"**. Designed specifically to meet the demanding needs of the **IBM USER.**

Protocol Converters • IBM compatible printers • Coax multiplexers • Micro to Mainframe Communication products • Async terminals for IBM 3278 emulation • Synchronous modems • Plus many other communication products — all available in one FREE catalog.

Call us today to order your **FREE CATALOG**
1-800-241-4719. In Georgia call (404) 446-2764.
Also ask about our new **XPOINT RENTAL PLAN.**

XPOINT CORPORATION
5600 Oakbrook Pkwy.
Bldg. 130
Norcross, GA 30093

IBM 34/36/38 USERS

IN DEPTH/UNDERSTANDING COMPUTERESE

to improve the situation. DP professionals, like doctors and lawyers, should work a little harder at speaking English. Few people would have trouble understanding, "He programmed the computer to print calendars"; but most people would be taken aback by "He clobbered register 15 and blew away on an op exception in low core."

Patience is required, of course. Some people are as awed by programmers as they are by particle physicists, but the fundamentals of programming and particle physics are not inaccessible, if someone is willing to explain them.

If you find yourself using a technical term in conversation, stop and explain it. Acknowledging that the word is obscure is bound to be more acceptable to your listener than just using the word and acting as if he should understand it.

On the other hand, remember that DP is not considered universally an interesting topic of conversation. Choose your moments well; don't launch into a lecture on direct-access storage device architecture when your friend is discussing ergotism as a possible cause of the Salem witchcraft scare or how the Detroit Lions will do next season.

❞

You who speak computerese have to help here — tear out this article and give it to someone you love.

This is a specialized article, designed to provide an orientation for people who do not, and may never, program, use, design, operate or fix computers. The realities of your own DP experience will be different from what I've written here; my goal is only to help you to convey those realities better. You may be astounded at what I've left out. There is room for limitless amplification and addition, which I leave to you.

You who speak computerese have to help here — tear out this article and give it to someone you love. Then stand by to guide the person over the rough spots, illuminate with examples and, most importantly, add specific detail to areas that I have carefully generalized.

To the friend of the DP professional: Between 1981 and 1990, the U.S. Bureau of Labor Statistics says, the number of people who program, operate and repair computers will increase by up to 700,000, reaching almost two million. Add in people who enter data for computers to use, those who lack extensive computer knowledge but happen to use computers frequently on their jobs and those millions who have bought their own home model.

All this is to say that you should not be surprised that you seem to know a lot of people who know computers.

You will have noticed, I think, that people who work with computers speak an esoteric language and do not exhibit much concern that others may not understand them.

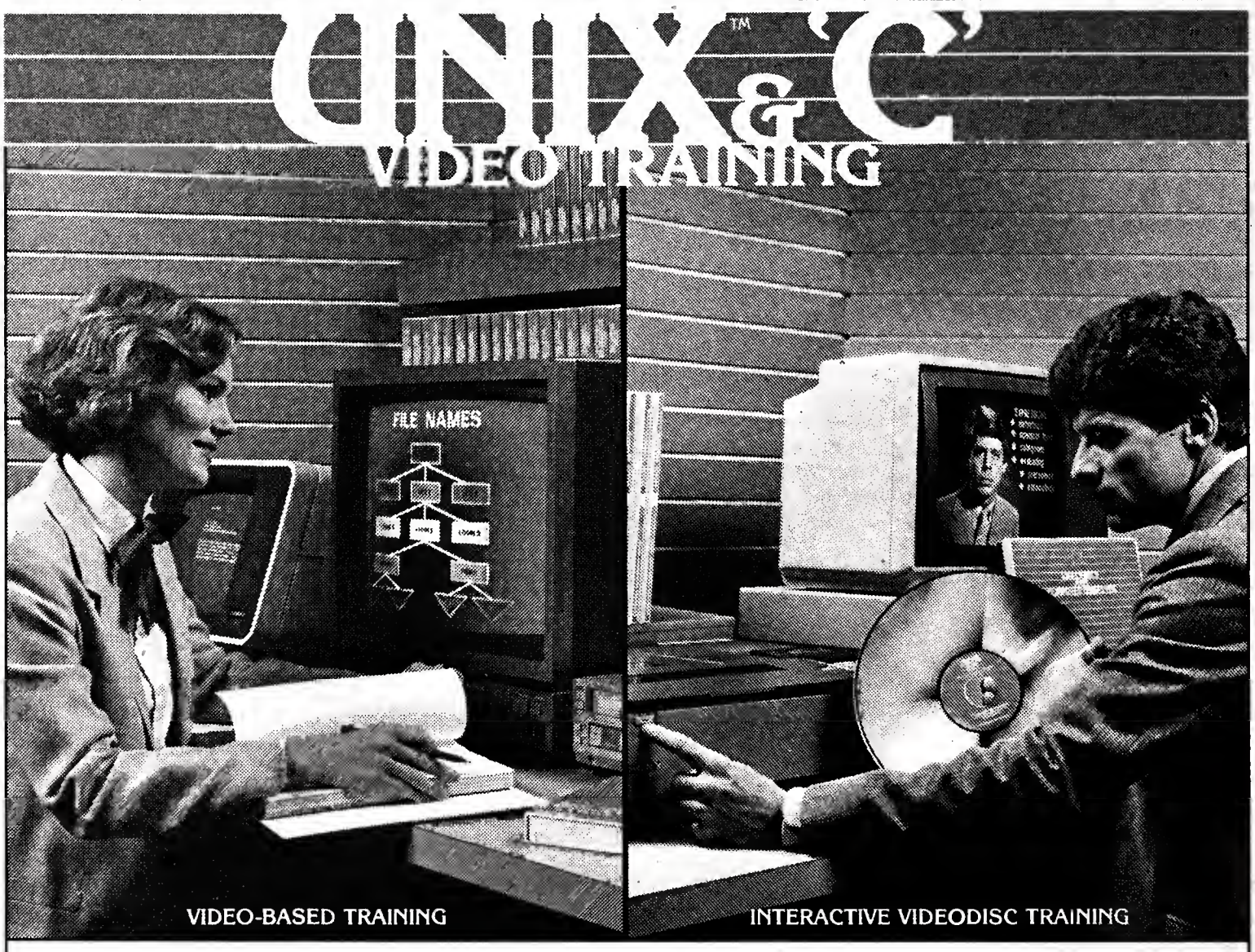
This article is a sort of self-defense manual to help those who don't know (or care) much about computers to communicate with anyone who does.

You may skip over any section or ask your personal expert what he thinks would be most useful to you. The object, after all, is to permit the two of you to communicate better, not to make you an expert yourself.

I am presuming that you do not consider computers to be the most exciting subject in the world. It may encourage you to know that the author agrees with you.

Imagine you've come home after a hard day at work. You settle into your favorite chair with a glass of wine and a book. Suddenly, a crazy person explodes through the front door, ranting every bit as intelligibly as the foreman of the crew that built the Tower of Babel: "Trace tables corrupted! Command reject on SYSRES!" the person shouts.

UNIX™ & 'C' VIDEO TRAINING



VIDEO-BASED TRAINING — INTERACTIVE VIDEODISC TRAINING

SELF-PACED TRAINING AVAILABLE WHENEVER YOU NEED IT

The Computer Technology Group offers an extensive library of video courses on UNIX and 'C' language subjects—for managers, end users, applications developers and technical support. Depending upon the type of training you prefer and the number of people to be trained, select Video-Based Training or Interactive Video disc Training.

VIDEO-BASED TRAINING
- Consistent training every time
- Ideal for self-paced or group instruction
- Professionally produced with a variety of graphics techniques for training effectiveness
- Available in all cassette formats and all international standards

INTERACTIVE VIDEODISC TRAINING
- Benefits of both Video-Based Training and microcomputer access
- Dynamic tailoring of each course to the individual student
- Increased student comprehension in reduced training time

THE COMPUTER TECHNOLOGY GROUP

Three factors make the Computer Technology Group the experts in UNIX and 'C' language training:
- Experience, through training thousands of students worldwide in live seminars, with thousands more using our video training at their own locations.
- Extensive Curricula Supporting All UNIX Versions, creating a client base of manufacturers, software developers and end users.
- Quality of Instruction, with instructors and course developers who are experts in teaching UNIX and 'C', as well as in designing and implementing a variety of UNIX-based systems.

ASK FOR OUR 48-PAGE COURSE CATALOG, WHICH PROVIDES:
- Comprehensive course outlines
- Course prerequisites
- Curriculum recommendations for multiple audiences
- Guidelines for cost effective training media selection

CALL (800) 323-UNIX or
(312) 987-4082 in Illinois

™UNIX is a trademark of Bell Laboratories

MANY UNIX-BASED SYSTEMS
ONE UNIX TRAINING COMPANY

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave., Chicago, IL 60604

Q. IF A MODEM IS A MODEM IS A MODEM, DOES IT REALLY MAKE A DIFFERENCE WHICH ONE I BUY?

A. The fact is, all modems are not created equal. For example, some modems are better signal processors than others. And these superior modems can make an important difference in your total network performance. A difference that can lead to important savings in telecommunications costs.

Q. How can a modem make a difference in my telecommunications costs?

A. The primary purpose of a network is to move information to and from end users and thereby improve their productivity. And a superior modem can improve the performance of your network in at least four areas: It can make your network more reliable. Give your end users faster response times. Minimize the time you and your people spend on network management. And a superior modem can also save you money in line charges.

Q. What makes a superior modem?

A. As you know, a modem converts a data stream into a signal that can be sent (usually over a phone line) from Point A to Point B.

Now that may sound simple enough, but there are a number of variables in that seemingly simple scenario. Such as, what's the distance between Points A and B? What's the line between the points? What's the condition and stability of the line? And many, many more. The point is, each variable carries technical implications that affect the design of the modem. And simply stated, a superior modem enjoys a superior design.

Q. Be specific. How can a superior modem save my company money?

A. Let's face it, modems are not the most expensive part of your telecommunications network. Chances are, line charges are. If you design a modem that can send data more reliably, then that modem can begin to affect your line charges. Every time a modem has a "hit," or an unsuccessful transmission of data, the data must be retransmitted, slowing down response time. The net effect is a reduction in the amount of information carried by the network.

If you use superior modems that give fewer hits, you'll have lower line costs per data unit transmitted and better throughput. Better throughput translates into time and cost savings.

Q. Can a superior modem correct the problem of faulty lines?

A. A superior modem can go a long way toward compensating for poor line conditions—and thus make marked improvements in the hit rate.

Take the IBM 3865 Modem, for example. It contains a custom microprocessor with an advanced algorithm that in effect enlarges the target area of acceptable transmissions. The result is that this reliable 9,600 bps modem can operate very effectively over unconditioned lines. Now imagine all the line conditioning charges you won't have to pay your common carrier.



Q. How can I go about proving the superiority of IBM modems?

A. Take your most troublesome line and put IBM modems on it. We believe you'll see an impressive improvement. Which leads us to another benefit of superior modems—you'll spend less time troubleshooting your network simply because line conditions that once were considered problems aren't really problems any more.

There are a number of other good reasons why you should consider IBM's line of 2,400, 4,800 and 9,600 bps stand-alone and rack-mounted modems. Not the least of which is that we've recently announced two new modems—the IBM 3833 and 3834—which feature lower prices, smaller packaging and improved serviceability. And like all IBM modems, they can fully utilize IBM's Communication Network Management capability.

The New IBM Modems

	IBM 3833	IBM 3834
Transmission Speed (bps)	2400 (full speed) 1200 (half speed)	4800 (full speed) 2400 (half speed)
Compatibility	3833, 3863-1,* 3868-1	3834, 3864-1,* 3868-2
LED Diagnostic Indicators	standard	standard
Communication Facilities	4-wire, point-to-point or multipoint	

Both modems operate over nonswitched telephone lines that can be leased (common carrier or PTT) or private.

*Must be in native mode. For full diagnostic capability, must be equipped with the Extended Diagnostic feature.

What's more, we've also recently lowered the prices of the IBM 3863, 3864, 3865 and 3868 Modems by as much as 29 percent. And there are also volume discounts available. If you're looking for modems that offer reliability, can improve end user productivity and are competitively priced, talk to your IBM marketing representative.

If you would like to receive a free brochure on IBM modems, call 1 800 IBM-2468, Ext. 90. Or use the coupon below. After all, it pays to be informed, because not all modems are created equal.

IBM®

4-29

IBM
DRM, Dept. KQ/90
400 Parson's Pond Dr.
Franklin Lakes, NJ 07417

☐ Please send me a free brochure on IBM modems.
☐ Please have an IBM marketing representative call me.

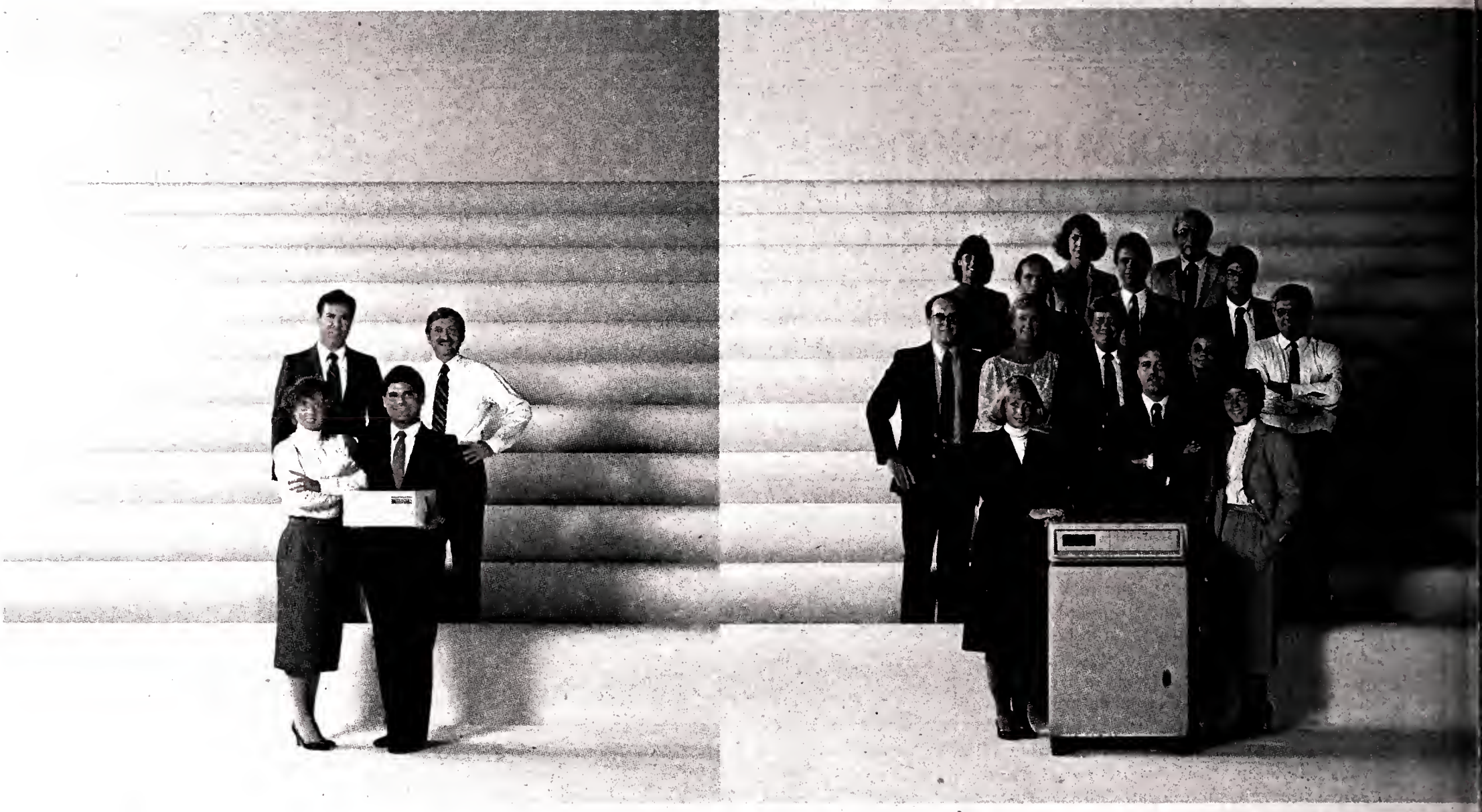
Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Phone_____

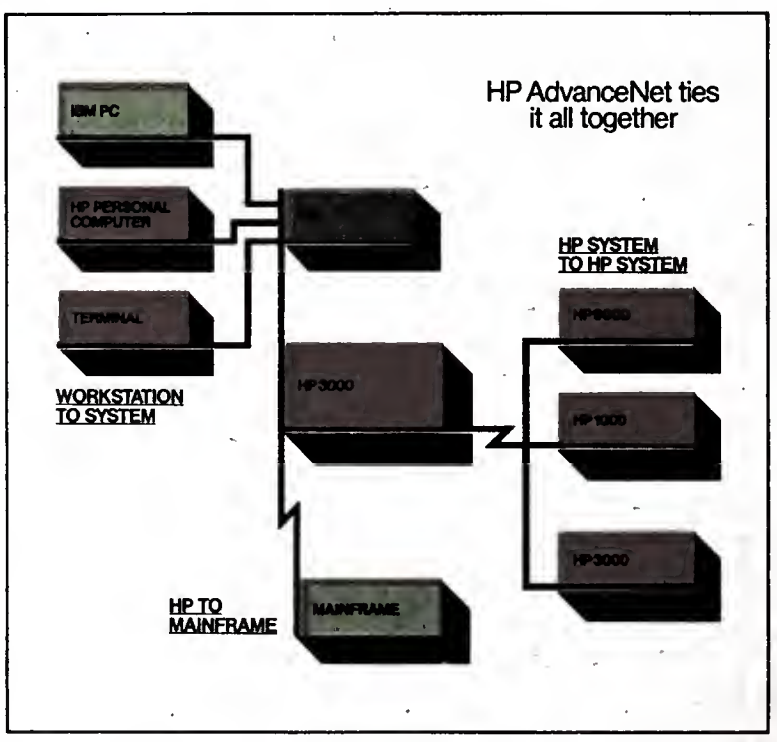


The HP 3000 compu

However much you change, you're going to need both office automation *and* distributed data processing. Fortunately, one company gives you both in a single system.

Hewlett-Packard's HP 3000 is a fully compatible family of computers, ranging from a new system that handles as few as two users to a distributed mainframe that connects up to 400. You can run the same software right up the line.

And our systems can change and grow as you do. When you're ready for upgrades and additions, you simply plug your existing programs into the new systems. No recompiling. No time and money wasted on conversion.



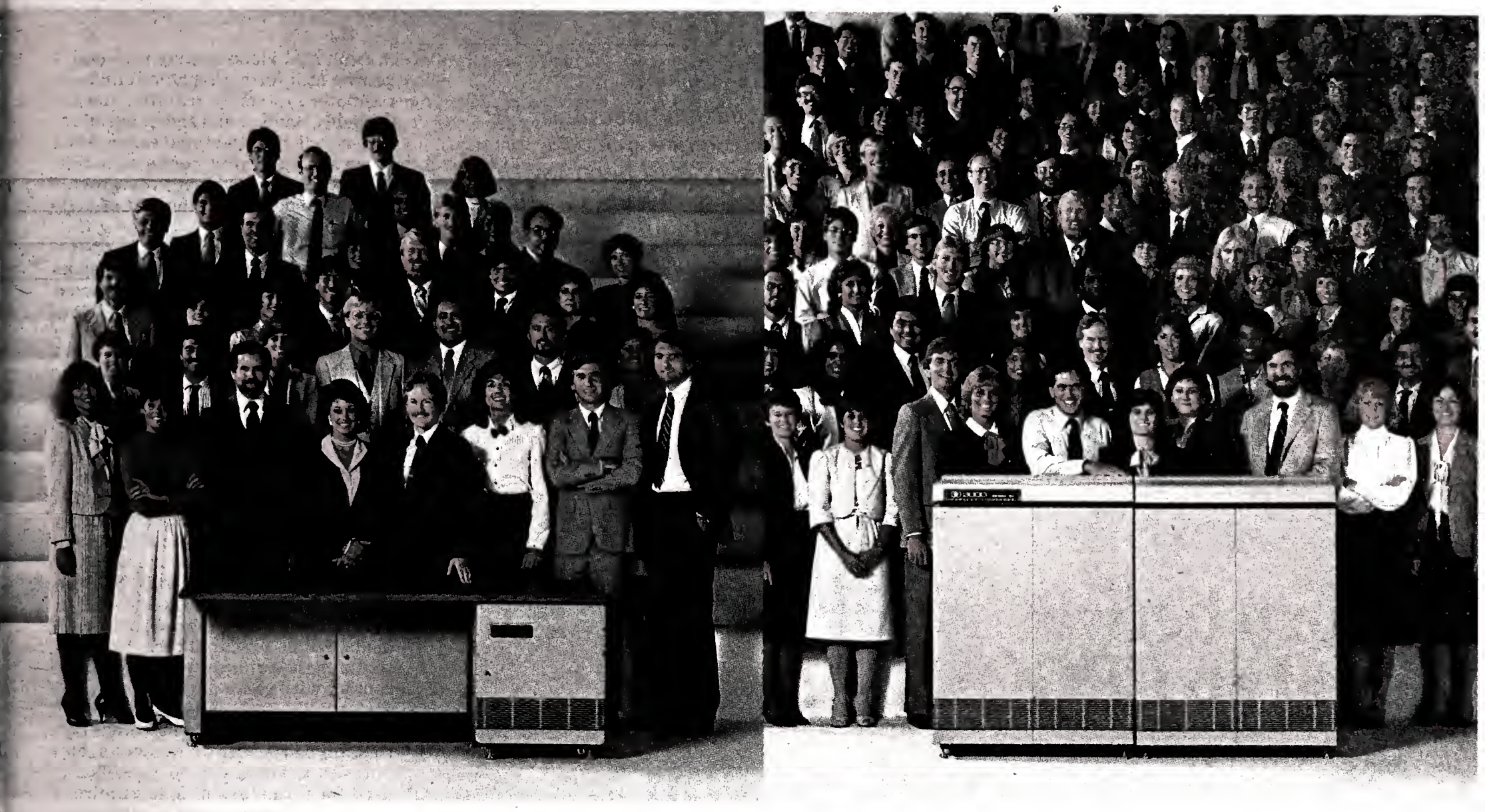
A small, but mighty, addition.

The new HP 3000 Series 37 Office Computer, the latest member of the family, puts the power of the HP 3000 within the reach of smaller budgets.

So now you can afford to give your branch offices and departments their own systems. And they'll still remain part of your overall DP picture with links to other systems.

In the office, the HP 3000 is the heart of our Personal Productivity Center. This integrates the information people need to get their jobs done more productively.

It provides an interface for a wide range of workstations, peripherals and personal computers, including our Touchscreen Personal Computer and The Portable, as well as IBM PCs. And it allows them to interact directly with



ter. One family fits all.

the HP 3000. So your people won't have to learn DP commands.

You'll communicate better with HP AdvanceNet.

Our communications go well beyond this office network. With HP AdvanceNet, they extend to links with other HP 3000s, in the same building or on the other side of the world. And to your mainframe computers, ours or IBM's.

Currently, more than 10,000 HP 3000 systems are working in networks so effectively that our communications were voted #1 in a national survey.

A Datapro poll also rated our service #1. So you get more than office automation and data processing in a single system. You get all the support you need from a single company.

To find out more about the single solution for both sides of your company, send us the coupon. (To make it easier, just attach your business card.) In Canada, call 1-800-387-3867.

We'll send you complete information, including our 12-page brochure. It shows how we can fit you no matter how much you change over the years.

☐ Send me a copy of The HP 3000 Business Computer Systems: *The Hewlett-Packard Approach to Selecting a Business Computer.*

☐ Have an HP representative call me to answer questions.

NAME _____

TITLE _____

COMPANY _____

DIVISION _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____

Mail to: Bob Hall, Hewlett-Packard, Dept. 003218, 10520 Ridgeview Court, Cupertino, CA 95014.

HEWLETT PACKARD

ISO2509

"Did you have a bad day?" you ask.

"All I did was add one little transient to the SDL!" the person raves on, swigging copiously from your wine bottle. You carefully move easily broken objects to higher ground.

You may recognize that lunatic as the DP professional in your life. Although things may not get quite so out of control in your household (they do in mine), probably you have noticed some communication problems when it comes to talking about computers. Perhaps you don't even have a clear idea of what that individual does all day.

And it's half your fault.

Oh, I know you've been sympathetic, and sometimes listened to computerese all evening long, without understanding half of it. But that's precisely the point: when you didn't understand, you should have raised a hand and said, "Hold it, Jack!" (or Jill, or Fred or Sue, as the case might be) — "What on earth are you talking about?"

> *If you work with or live with someone in DP, both of you will have to work at understanding each other. And because the size of the DP lexicon is growing, it will be a never-ending job.*

Just as your physician might unthinkingly advise you to "ingest 10 grains of acetylsalicylic acid" instead of telling you to "take two aspirins," people who work with computers sometimes forget which words in their vocabularies will not be found in a standard dictionary. It's up to the people who do not work with computers to remind the ones who do when they have strayed from the realm of comprehensibility.

It is possible you are less confused by people who talk about computers than you used to be. You probably have seen television programs where the hero (or, more often, villain) sits in front of a video display terminal getting at information stored in a computer system. In real life, you probably have seen a ticket agent or a bank teller do the same thing. And when a writer throws out a term like "video display terminal" you probably can visualize just the sort of thing he's talking about.

You have become, believe it or not, more computer literate than you used to be. For example: Do you ever use the word "input" — as in "I'd like to add my input to this discussion"? Were you using that word in 1970? Probably not. You have been exposed to the language of computers by the media and politicians and (of course) the people you know who know computers.

You may have heard warnings from university and government officials that people who don't understand computers will a few years from now have the same status as people who can't read today. Schools are forcing school boards and students to buy computers so the students will be prepared for a future that almost certainly will involve contact with computers.

Actually, the trend in computer technology is to design machines that anybody, with or without computer experience, can operate. The need for formal training to acquire computer literacy has already begun to decrease. Already, anybody old enough to read a simple sentence can use a well-designed computer system.

It no doubt sounds as if I am proposing arguments for not reading an article like this one. I haven't shown you the other side of the coin: The more user-friendly a computer system is, the more complex it must be. To make things easier for us (the users of computers), computer hardware and software engineers have to dig ever more deeply into their bag of technical tricks. It's very easy to design a computer that is difficult for anyone to use — and vice versa.

What this means, clearly, is that people who work in the world of data processing are going to have an even more sophisticated language all their own as the years go on, with more and more new and obscure terms. If you work with or live with someone in DP, both of you will have to work at understanding each other. And because the size of the DP lexicon is growing, it will be a never-ending job.

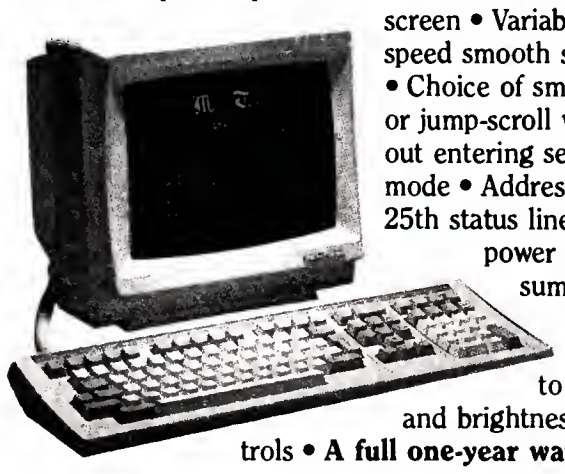
Is it worth the trouble? That depends on whether you wish to communicate with people in DP or merely listen to them. The purpose of this article is to give you a running start

Torn between a DEC® VT220 and an ERGO® 320?

Permit us to confuse you with the facts.

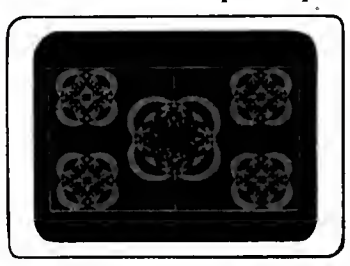
Compatibility
The Micro-Term ERGO 320 is fully compatible with the DEC VT220 and emulates **all** DEC functions.

Features
Other popular ERGO 320 features not found on a VT220: User-programmable compose key • User-programmable function keys • Function keys in VT100 mode • Flashing LEDs indicating Xoff has been enacted • Superior 132-column clarity • Bi-directional printer port • Erase or save 80/132 screen • Variable-speed smooth scroll • Choice of smooth- or jump-scroll without entering set-up mode • Addressable 25th status line • Low power consumption • Easy access to on/off and brightness controls • **A full one-year warranty.**



Design
The ERGO 320 is ergonomically designed and housed in an attractive, compact case with an adjustable monitor and smaller footprint than the DEC VT220. The detached, low-profile keyboard, is shorter than the DEC VT220 keyboard, and has an easy-tilt adjustment to provide ease of use for **all** users.

Graphics
Upgradability. The ERGO 320 can accept an optional graphics board ($745) which will perform all Plot-10 and ReGIS functions. The graphics board, which turns an ERGO 320 into an ERGO 340, can be added to existing ERGO 320s. The small footprint is maintained when adding graphics to an ERGO 320 but must be forfeited when purchasing a VT240. **Fast, too.** In addition, our graphics offers significant speed advantages over a VT240— as much as **seven times** faster. (See an actual comparison above.)



ERGO 340
Elapsed Run Time: 11.0 sec.



DEC VT240
Elapsed Run Time: 11.0 sec.

Price
Micro-Term prides itself on designing and manufacturing innovative products, with **complete** emulations and aggressive pricing. At a list price of only **$795,** the ERGO 320 with all the additional features and upgradability should take the confusion out of your decision.

$795

MICRO-TERM

Terminals are our only product, and we put more into them.
Call or Write: **MICRO-TERM, INC.,** 512 Rudder Road, Fenton (St. Louis County), Missouri 63026
(314) 343-6515, TWX: 9107601662, MICROTERM, STL.
On-site service available at over 450 locations through Western Union

DEC VT220 and DEC VT240 are registered trademarks of Digital Equipment Corporation.

IBM/38–36 INFO CENTER. TODAY!

PC INTERFACE AVAILABLE

Call or write for details on FUSION's Information Center. Includes integrated retrieval processor (report/queries), personal database and IBM PC Interface.

FUSION
FUSION PRODUCTS INTL.
(415) 461-4760
900 LARKSPUR L.C. #295
LARKSPUR, CA 94939
TELEX 176099

at the former — and presumes you are tired of the latter.

Answer A or B to the following question: the computer is a useful device primarily because of its (A) speed or (B) intelligence.

If you answered B, or were tempted even vaguely by it, it is possible you have been convinced by magazines, newspapers, films or television that computers have brains. Not so. A computer is, at its roots, only a very speedy electronic calculator. It has no innate intelligence, although some computers may be furnished with instructions and information that allows them to mimic, in a small way, human reasoning.

Bad reputation

Yet somehow computers have developed a terrible reputation. Bank tellers blame them for losing your savings account; customer service representatives point their fingers at them when the summer issue of a magazine arrives in your mailbox just in time for Christmas. In novels and films, computers are found doing everything from taking over the world to harboring indecent thoughts about a sexy heroine.

Actually a computer is not much more likely to lose your savings account than it is to demonstrate a lust for blondes. A computer, on its own, can't lose anything. (In fact, a computer is too ignorant to make any mistake. It requires that a human define the procedures it must follow to make a mistake.) And lust, of course, is an emotion, which is something a computer will never have. But about them taking over — there's some truth in that.

There may be computers skulking about your living room (in your television or stereo) or lurking in the shadows of your kitchen (in your microwave oven) or laying in wait somewhere under the hood of your car (a new car is likely to have half a dozen).

Computers are pervading our world not because they are smarter than you and I, but because there are so many tasks a computer can do more quickly, dependably and efficiently than humans can. Let's take the problem 84,577,506 divided by 56,498. Not so bad. But try performing a million such calculations. It would take a person with average arithmetic skills a couple of years, with no breaks for eating, sleeping or sharpening pencils.

Yet the typical large computer could have the job done in a second — literally. Or let's say you've got to adjust two valves, one controlling gasoline, the other controlling air, making sure the right mixture is going into the cylinders of your car's engine.

The mix has to change according to acceleration or deceleration, the temperature of the engine and the load on the engine, and it has to change quickly and often.

Even if you could keep the valves adjusted properly (which isn't likely), you'd be bored to tears with doing it long before you reached Grandma's house. But a computer would do the job unflinchingly and perfectly for as long as it had current flowing through it.

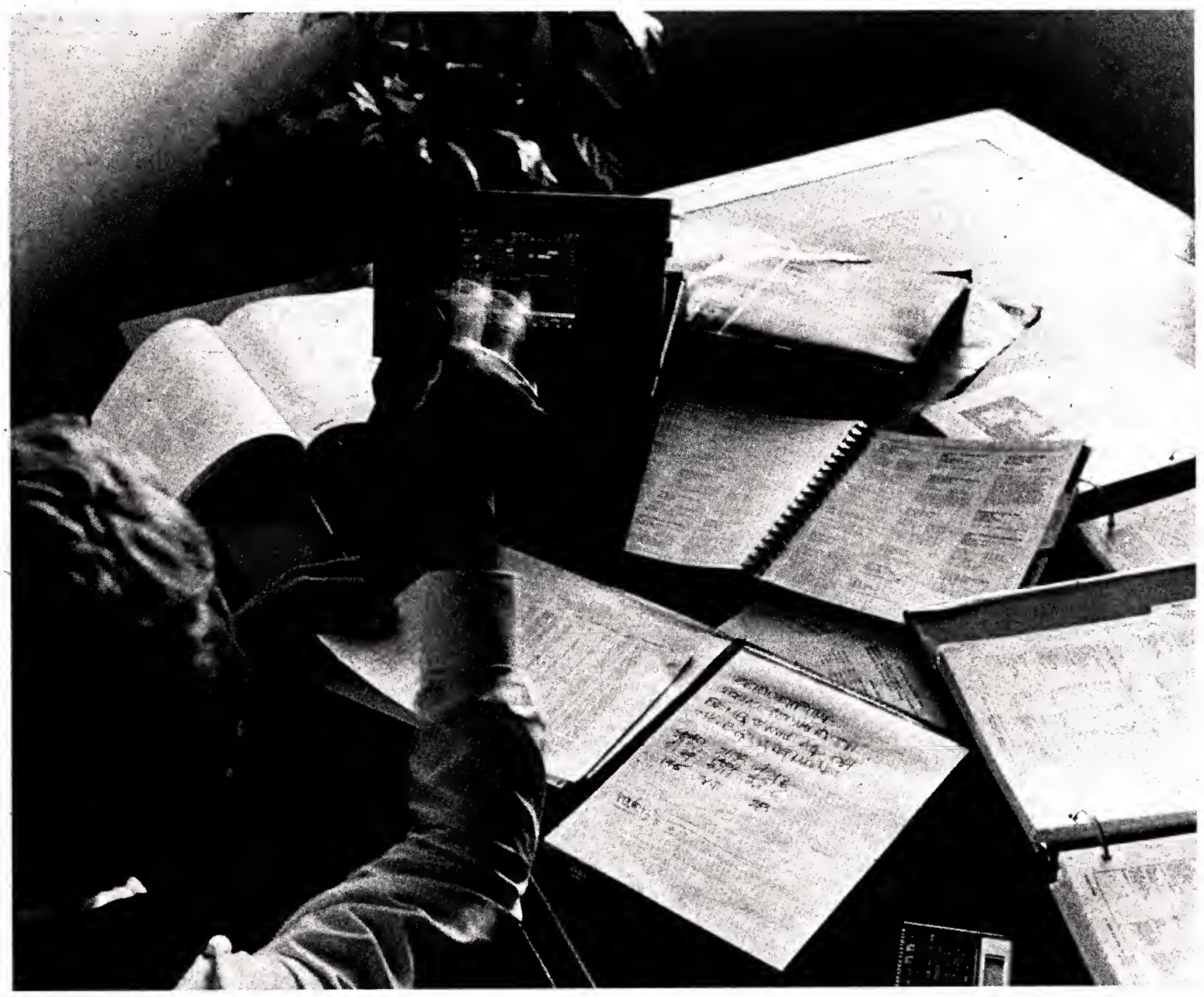
A computer will do, mindlessly, precisely what it is told to do. Do not accept the explanation "computer error" when your checking account has an overdraft for $6 million. Tell the bank that programmers, keypunchers and computer operators make mistakes, but computers do not.

(I have to admit to one exception to this rule. It is possible for electrical or mechanical malfunctions to destroy or alter information stored in a computer. But a well-designed machine will detect a problem like this and allow a human to intervene and recover the lost information.)

The thousands of ways computers have changed our world testify to the intelligence of man, not computers. A computer that beats a human chess champion at his own game is very impressive, but what should be more impressive is the accomplishment of the person who instructed the computer; that person was either a very good chess player or a very good computer programmer — or both.

And the machine itself? A team of talented and informed people spent years designing it. (Of course, only the names of the chess champion and the computer will make the eleven o'clock news.)

A computer is a tool. So is



THE MOST VALUABLE EQUIPMENT WE OFFER IS FREE.

Getting the right data processing equipment shouldn't be costly. And USL Data Systems is equipped with applications experts who make sure of that. Absolutely free.

When you rent, lease or purchase, there is no risk of getting the wrong equipment. Our applications experts make sure you get the system that's exactly right for you. And we don't just provide a limited number of products. We have all the leading brands in stock for immediate delivery. Hardware and Software.

And because you're renting or leasing from USL Data Systems, there's no risk of your system becoming obsolete. No risk of over expending your capital. We offer the most flexible financial options in the business.

Short term, long term, lease-to-own, outright purchase, and more. Plus top service and support, including a toll-free hotline.

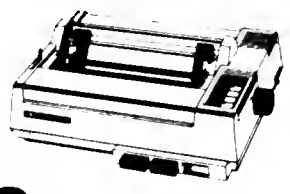
Phone **(800) 835-2246**, ext. 184 and ask for the applications expert nearest you.

USL Data Systems

A U.S. Leasing Company
2988 Campus Drive
San Mateo, CA 94403
(800) 835-2246 x 184

YOUR TEXAS INSTRUMENTS SOURCE

SPECIAL DEALER PROGRAM



855 Printer

Model 810 RO Work-Horse of the Industry
Model 820 RO/KSR
Model 850/855 Draft & Letter Quality
Model 860/865 Draft & Letter Quality

WE CAN IMPROVE YOUR PROFITS THROUGH OUR DEALER PROGRAM

1-800-221-1127

1-201-376-4242 1-412-881-2590
1-203-932-6383 1-518-465-1700
1-212-662-0060 1-609-829-7280
1-215-972-0283 1-617-451-6550
1-301-358-7820

WESTWOOD COMPUTER CORPORATION

IN DEPTH/UNDERSTANDING COMPUTERESE

a shovel. In two very different periods of our development, mankind invented them both. And there's nothing so very awesome about a shovel, is there?

Glossaries usually are at the end of a book, because a glossary is normally an optional reference — a handy place to look up an unknown word.

Unfortunately, it is virtually impossible to talk about computers without using specialized language, so I have labeled this chapter "Required." You may be surprised at how many words are familiar. However technical a language computerese might be, most of it consists of ordinary English words bent to a special purpose.

The most common word in conversations about computers is **data.** It means information — and that's all you need to know. **Data processing** means "doing something with information," but more often it is accepted as meaning "a computer doing something with information." **DP** can mean the department where the computer is located ("Go see whether DP has any spare rubber bands") or what line of work someone is in ("I'm in DP") or a few other things.

> *However technical a language computerese might be, most of it consists of ordinary English words bent to a special purpose.*

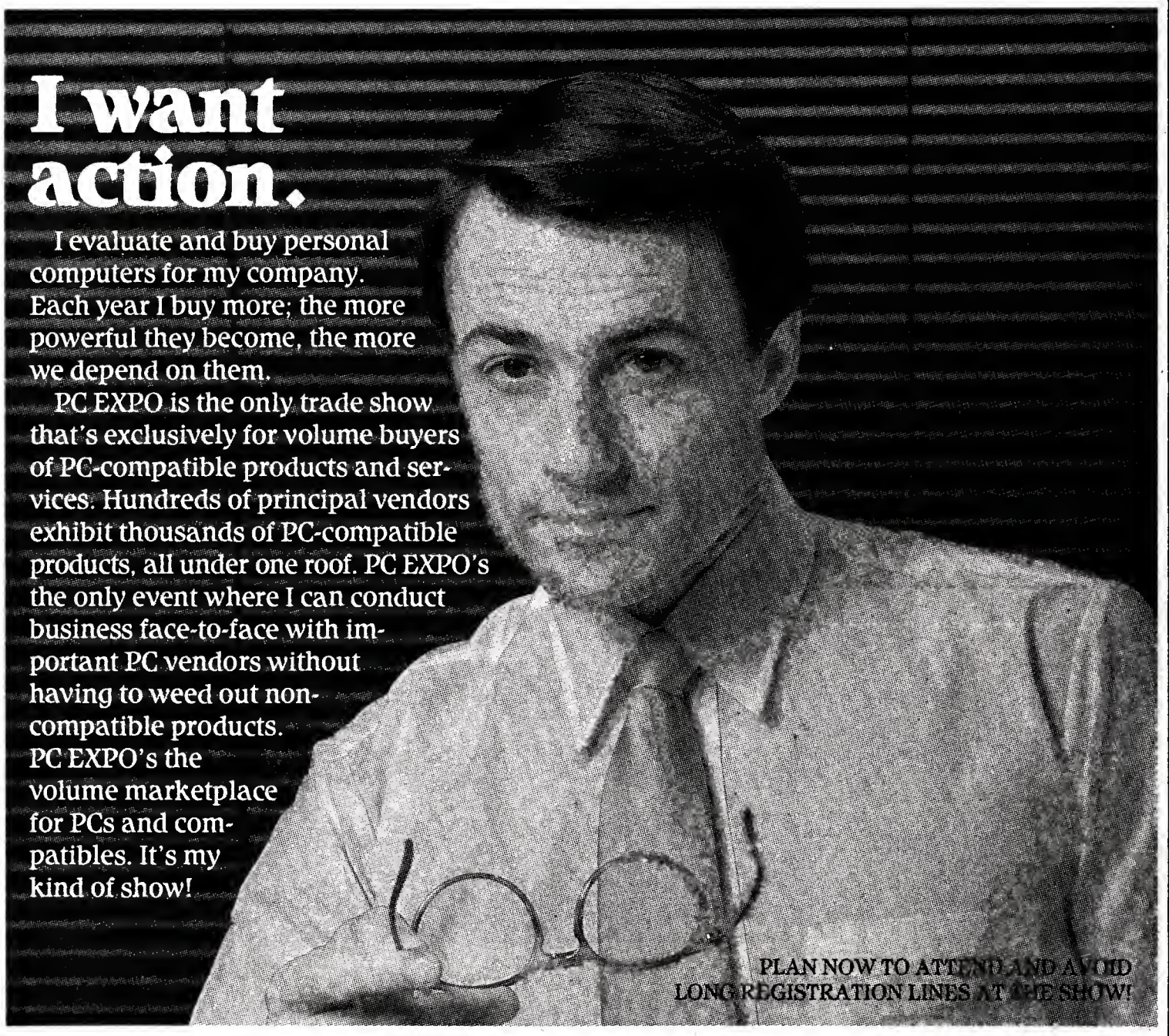
Strictly speaking, the word data is plural, meaning more than one datum. For example, your Social Security number is a datum kept on file by the Internal Revenue Service, and your name and address are among the other data that are kept.

Unfortunately, data has come to be used for both plural and singular, so that one is more likely to hear the phrase "the data is correct" than "the data are correct." In lieu of the word datum, phrases like "piece of data" are in common DP usage.

A large computer is often referred to as a **mainframe** or a **CPU** (central processing unit); smaller computers are minis or micros. This discussion relates primarily to large computers, and a **computer**, as far as we'll be concerned, is a complex electronic device that can be directed to process data rapidly and accurately. Exactly what is meant by "process" depends on the particular **application.**

One application of computers is performing arithmetic calculations upon data, but there are other things that can be done to data: Data can be printed, tallied, sorted, compared, added to, deleted from, combined and translated, to name a few. And there are any number of ways in which the functions may be combined.

But before a computer will accomplish anything at all, it requires instructions. The act of writing the instructions in a language suitable for computers is called **programming.** A **program** is one set of such instructions (which would be written by, of course, a **programmer**). A **program** defines the procedures a computer must follow to accomplish some desired result. Usually more than one program is required to perform a job (a **job** is simply some task, defined by a human, that a computer is required to complete). Several programs that relate to each other — for example, all the programs relating to



3RD ANNUAL PC EXPO ADVANCE REGISTRATION

NEW YORK COLISEUM JUNE 17-19 1985

PC EXPO®

NAME
BUSINESS TITLE
COMPANY
COMPANY ADDRESS
CITY STATE
MAIL STOP (if any) ZIP
TELEPHONE

Use one form per person. Photocopy if necessary.

PC EXPO attendees must be qualified. Please check one box only in *each* of Fields I and III or Fields II and III. (Minors may not register.)

TRADE RESELLERS—YOUR COMPANY'S MAIN BUSINESS ACTIVITY

I
1 ☐ Computer consultant
2 ☐ Computer dealer dist
3 ☐ Computer OEM
4 ☐ Office products dealer
5 ☐ Service vendor
6 ☐ Software developer
7 ☐ Systems house
8 ☐ Turnkey vendor
9 ☐ Value adder
10 ☐ Other (specify) _____

CORPORATE VOLUME BUYERS—YOUR COMPANY'S MAIN BUSINESS ACTIVITY

II
A ☐ Accounting firm
B ☐ Advertising
C ☐ Banking
D ☐ Communications
E ☐ Construction Architects
F ☐ Credit
G ☐ Education
H ☐ Engineering
I ☐ Government Military
J ☐ Hospital
K ☐ Hotel
L ☐ Industrial design
M ☐ Insurance
N ☐ Law office
O ☐ Management consultant
P ☐ Manufacturing
Q ☐ Publishing
R ☐ Real estate
S ☐ Research Development
T ☐ Retail sales
U ☐ Securities broker
V ☐ Transportation (all)
W ☐ Utility
X ☐ Wholesale/Retail sales
Y ☐ Other specify _____

YOUR JOB FUNCTION (Check main one only)

III
AA ☐ Accountant
BB ☐ Administrator
CC ☐ Consultant
DD ☐ Corporate officer
EE ☐ Creative arts (all)
FF ☐ Designer (all)
GG ☐ DP/WP manager operator
HH ☐ Engineer (all)
II ☐ MIS Dir. Mgr
JJ ☐ Programmer
KK ☐ Purchasing
LL ☐ Sales/marketing
MM ☐ Scientist
NN ☐ Securities / financial analyst
OO ☐ Service technician
PP ☐ Systems analyst
QQ ☐ Other (specify) _____

Signature _____

Save Money and Time! Register by Mail

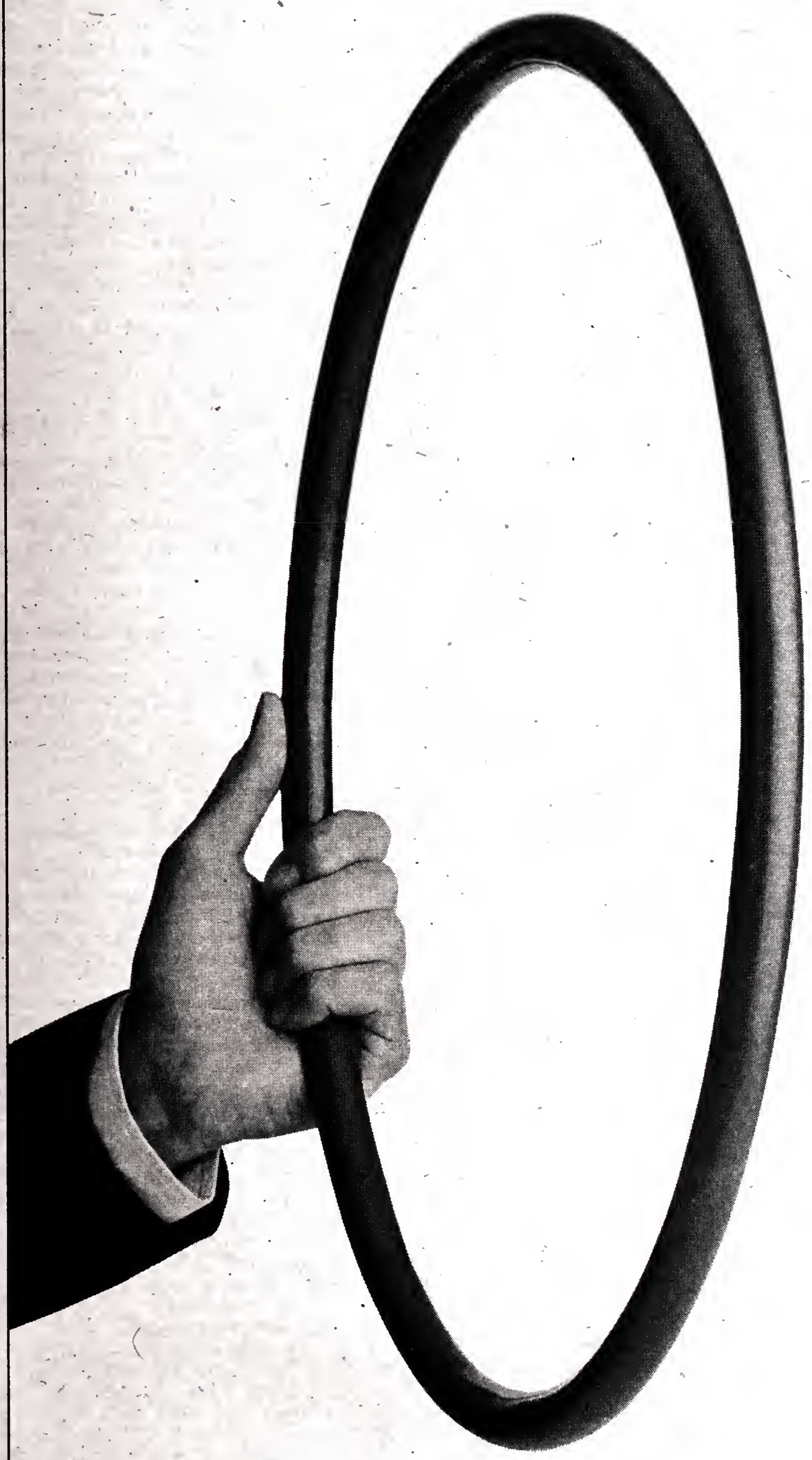
☐ 1 day $20—Date must be given here _____

☐ 2 or 3 days—$40
(On-site registrations are $25 for 1 day, $50 for 2 or 3 days.)

MAIL ORDERS must be received by PC EXPO no later than May 29, in which case your show badge will be mailed to you on or before May 31. Mail orders received after May 29 will be processed and the badge held for arrival under the individual's name at the "Will Call" desk in the show lobby. Registration fees must be in U.S. funds. All foreign mail orders, except Canada, must be received by May 13 and such badges will not be sent by return mail, but held at the "Will Call" window for pick-up on arrival. All registrations are non-refundable.

Mail check payable to PC EXPO with completed registration form to: PC EXPO, P.O. Box 1026, Englewood Cliffs, NJ 07632.

☐ **Check box to receive free PC EXPO Volume Buyers Guide.**



Is this what IBM makes you go through every time you need an upgrade?



When you want to move up from one IBM computer to another, you often have to perform some pretty costly (and time-consuming) tricks.

For example, before you can jump from an IBM System 36 to an IBM System 38, you have to convert to a different operating system, different source codes and different software.

And when you're ready to make the leap to an IBM 4300, the degree of difficulty increases dramatically.

Not so with Wang.

Every computer in the Wang VS line supports the same software, utilities and documentation. Which means you can upgrade from one VS system to another with the greatest of ease.

And with Wang's RPG II Conversion Aid, you can even convert from IBM to the Wang VS line faster and less expensively than you can convert from one IBM system to another.

So if you're facing a computer upgrade, call your local Wang office.

We'll show you why our VS series runs rings around the competition.

WANG

We put people in front of computers.

© 1985 Wang Laboratories, Inc.

the processing of a payroll — are referred to as a **system.**

Because the programs that process payroll are applying the computer to a specific problem, they are known together as an **application system.** Such a system may consist of several jobs. In the example of a payroll system, a job might be run every two weeks to print paychecks, and another job might be run monthly to print a report for the company president showing how much money was spent on overtime.

Another kind of system is the **operating system**. This group of programs does not produce anything as tangible as paychecks. It is both the servant and overseer of all other programs. A job will not start until the operating system ascertains it has the resources available to run it. An application program — like the one that prints paychecks — really submits requests for resources to the operating system and does not use the resources directly. So the paycheck program will announce to the **system** it has a check to print, and the system will actually issue the commands that initiate printing.

Notice that "system," with no qualification, usually means "operating system." The operating system designed by one large computer manufacturer is called the Master Control Program, or MCP, a name that sums up the concept of an operating system neatly.

The programs that make up an operating system usually are bought or leased from the same firm that built the computer the system runs on. Application systems usually are written at the installation where the computer is used, but they may also be purchased or leased. Both sets of programs are generally referred to as **software**, to distinguish them from **hardware. Hardware** means actual, physical devices, like a printer, or the computer itself. Software, as a rule, is what instructs hardware.

It is doubtful you can have avoided seeing the **output** of the sort of printer that is attached to a computer. Your monthly bank statement will almost assuredly be generated by a computer, as will any piece of junk mail that has your name inserted in it somewhere ("Dear Mr. Plunkett of Green Falls, Nevada, you may have won One Million Dollars!!").

This sort of printer was designed to accept different kinds of paper (**forms**) so that the same printer that was used to print the junk mail can later be used to print address labels for envelopes and a report on how many letters have been prepared. To avoid having to put a form in a printer every time a page is done printing, such printers use **continuous forms**, which are many hundreds of pages attached to each other but perforated in such a way that they may be separated after printing.

A necessary type of attachment to a computer is some **external storage device**, which allows large amounts of data to be saved and, in some cases, to be transported to some other computer or to a vault for safekeeping. The storage in a computer is not sufficient for large amounts of data and, because it is a special kind of electronic storage, it gets cleared out every time the computer is turned off. That kind of storage — **computer storage** — is for data and programs that the computer currently is using. **External storage** is for data that must be saved.

The two most common types of external storage are **tape** and **disk.**

Tape drives are much like a home tape recorder in concept: A roll of tape, with iron particles on it, passes by an electromagnet, which aligns the iron molecules on the tape. Of course, a tape drive records and plays back data, not music. A library of tapes — all labeled and numbered — will normally be found somewhere near the tape drives.

Disk drives contain stacks of platters whose surfaces can be read by an electromagnet. The platters revolve at a high speed. When data is to be read or written, a device called a head moves to the proper spot along the radius of one of the disks and waits for the point on the disk to spin by that is to be read from or written to.

The advantage of this technique over tape is that data can be **randomly,** as opposed to **sequentially,** accessed. The situation is analagous to a cassette tape vs. a long-playing record. If you wish to listen to a song in the middle of the tape, you have to run the tape until it gets to the middle.

With the record, you could simply lift the tonearm and set it down at whatever song you wish. It works the same way with data: It is possible on a disk to access any datum almost immediately, without first accessing all the data that comes before it.

The advantages of tape over disk are cost and portability. It is cheaper to store large amounts of data on tape. A tape is about the size of two dinner plates, whereas a disk module (containing the platters mentioned above) is usually about the size of a bread box and is far more expensive to manufacture. Moreover, some disk modules cannot be removed from the disk drive itself, so if the owner requires more disk storage, it means a whole new disk drive, not just the platters that go inside it.

Most large computer users have both tape and disk.

When data is stored on disk or tape, it is grouped together according to the way it is used, and each group is called a **file.** Each file has a unique name, like "BOOK.SUBSCRIBERS" or "EMPLOYEES." A file contains one or more **records,** each one containing different data. The file called EMPLOYEES might contain a record for each employee, and each record might contain an employee's name, address, Social Security number and pay grade. A group of files that has a

Take Your Supermini To The Limit.



What you get out of your supermini is only as good as what you put into it. That's why Software International has created Peak Performance Accounting/Human Resource Software packages, specifically "Native" to Sperry, Hewlett Packard, Wang, Digital Equipment Corporation superminis, and the IBM 34, 36 and 38 hardware environments.

Choose from a full portfolio of feature-rich products including General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets, and Payroll/Human Resource Management.

Features That Leave The Others In The Dust.

Peak Performance Software is designed with full functionality including features like currency conversion, allocations, budgeting, statistical as well as monetary accounting. Plus, the most powerful report writer available anywhere. It's software flexible enough to fit the needs of the Fortune 1000, as well as those companies on their way to being there.

Peak Performance For Now And The Future.

As a member of the General Electric Company, Software International has the resources to support your software investment. Thirty offices worldwide provide the service levels you need to keep your installation running smoothly.

Find out why over 5000 companies have selected Software International. Send the coupon today or call us toll-free at 1-800-343-4133 (In Massachusetts 1-800-322-0491). We'll send you a free copy of our provocative booklet "50 Tough Questions To Ask Any Software Vendor."



Let Software International bring your supermini to peak performance today. It's a race worth winning.

Software International Corporation, One Tech Drive, Andover, MA 01810-2497.

Yes! I'm All Revved Up About Peak Performance Software.

Please send me your free "50 Tough Questions To Ask Any Software Vendor" booklet.

Name_____

Company_____ Title_____

Address_____

City_____

State_____ Zip_____ Phone No._____

I will require supermini Peak Performance Software for my:

☐ Sperry ☐ Hewlett Packard ☐ Wang

☐ Digital Equipment Corporation ☐ IBM/34, 36, 38

SOFTWARE INTERNATIONAL

CW-9

Software International is a wholly-owned subsidiary of General Electric Software Products Corporation.

logical relationship with each other is sometimes called a **data base.**

In the early days of computing, data was stored on punched cards. Although this technique is considered archaic in most DP circles, it does persist. To use cards for output from a computer, a device called a **card punch** is used; to use cards as input to a computer, a **card reader** is used. Card readers are used most often now merely to make the operating system aware of a job to be run, a process requiring only a few cards. This is called **job submission.**

It is not uncommon for all job submission to be performed from a video display terminal, also called a **VDT,** a **cathode ray tube** (or **CRT** for short), a tube, a terminal or a screen. The fact that there are so many synonyms should suggest just how common these things are. Software is available to allow many functions on a CRT. Programmers may use CRTs to write and change programs and to submit jobs to test the programs. Airline ticket agents use them to find out what seats are available on a particular flight. Entry clerks type in information about you on them when you subscribe to a magazine.

A special kind of CRT is used to monitor and control the computer and the jobs running on it. This is the **console,** and it usually can be found right next to the computer. The computer operator uses the console to communicate with the system. On most systems, several jobs can run at the same time — or that's the way it looks. Actually, the operating system divides up the use of the computer, doing a piece of this job, then a piece of that job, then a piece of this job again, going back and forth so quickly it appears to be running more than one job simultaneously. This is **multiprocessing.**

The ability to run jobs **concurrently** (which is not the same as simultaneously, remember) allows many computer users to make use of the same computer. Two basic kinds of activities may go on: **batch** and **on-line.** A **batch job** doesn't allow much human intervention, short of submitting it to the system. It requires a thorough explanation (to the system) about what data the job will require or write, what programs will be executed and so on. This explanation is submitted in a special **job control language** (or **JCL**).

On-line or **interactive** tasks are initiated by someone at a terminal. The information the system requires, about data and programs, has been supplied to the system already. All the terminal operator needs to do is type in requests and await replies, which will be presented on the terminal screen. In some contexts, the distinction between batch and on-line is denoted by background and foreground.

A different kind of program is required for interactive tasks than for batch tasks. Often a programmer will specialize in one or the other.

Programmers, like any humans, do not all speak the same language. Some write programs in **high-level languages** like Cobol, PL/I, Ada, Fortran, Basic or Pascal. High-level means "close to human language" (although a French Canadian might vehemently disagree). In Cobol, for example, if one wishes to display the current date upon the console, the correct command is: "DISPLAY CURRENT-DATE UPON CONSOLE."

Other programmers use a **low-level language** like Basic assembly language. This is a language more directly related to **machine language** — the language used within the computer — than to English. Any of the programmer languages must be translated into machine language before they are **executable** — able to be run on a computer. The programmer does not perform this translation by hand, of course; there is a program that does it for him, usually called a **compiler.**

Even once the program is translated to a series of digits that the computer will react to, there is no guarantee the program will work the

PCI introduces true file transfer.



Now there's a fast, efficient way you can connect up to 9 remote IBM PCs/XTs/ATs through a single communications port on your System 34/36/38.

And get true file transfer.

The new PCI-251 protocol converter & file transfer controller.

With PCI's new PCI-251, and our supporting micro-based and system-based software, you can sign on with PCs/XTs/ATs as 5251 workstations. Address your PC printers as 5256s. And move data files to and from your System 34/36/38 quickly and easily.

The uploading and downloading of your variable length records is now entirely menu-driven, and requires only a few keystrokes.

It's fast. Reliable. And just that easy.

More business computing power where you need it. From PCI.

No matter where your PCs are located, you can take advantage of PCI's System 34/36/38 communications solution.

Whether your PCs are connected direct to the PCI-251, by asynchronous dial-up, or through your PBX/CBX, they now have the power to communicate information vital to your business.

Like transmitting sales leads. Or transaction reports.

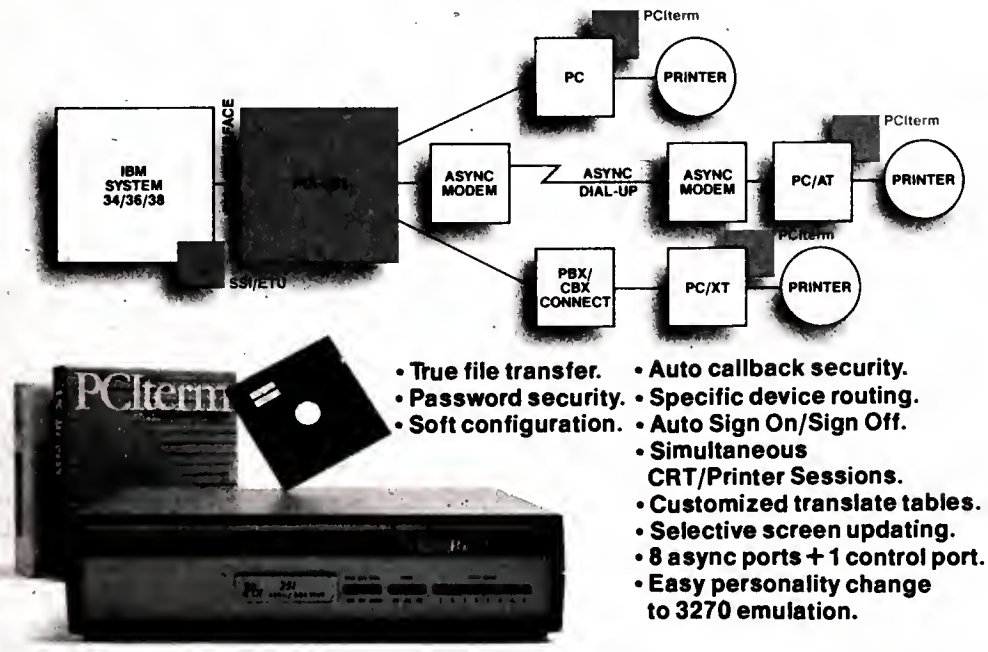
Communicating inventory reports. Transmitting spreadsheet data, or financial reports.

For complete information on PCI's System 34/36/38 file transfer solution, contact PCI today.

1 (800) 423-5904.
In Calif., 1 (818) 716-5500.
Telex: 275517.

PCI

Making the non-IBM world IBM compatible.



- True file transfer.
- Password security.
- Soft configuration.
- Auto callback security.
- Specific device routing.
- Auto Sign On/Sign Off.
- Simultaneous CRT/Printer Sessions.
- Customized translate tables.
- Selective screen updating.
- 8 async ports + 1 control port.
- Easy personality change to 3270 emulation.

IBM is a registered trademark of International Business Machines Corporation. PCIterm is a registered trademark of Protocol Computers, Inc.

TRADE IN OFFER ENDS JUNE 30!

Now through June 30, your old protocol converter could be worth up to $1,000 in trade-in. Write or call PCI today.

PCI Protocol Computers, Inc.
6150 Canoga Avenue
Woodland Hills, CA 91367

I want to know more about PCI's new PCI-251—and up to $1,000 trade-in offer.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ Host _____

CW 4/29/85

MANAGEMENT REPORTING/RETRIEVAL CAPABILITY
for THE IBM S/38
For more information Contact Charles White at:
michaels, ross & cole, ltd.
P.O. Box 4533
Oak Brook, IL 60521
(312) 986-9116

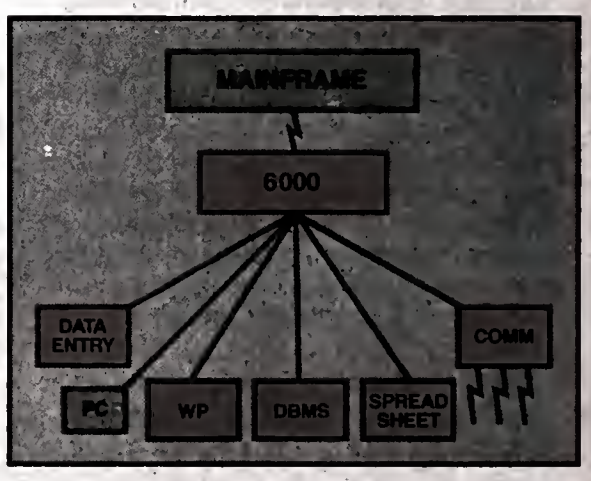
This can be the year



The 6000 Series is the one-system solution that connects end-users, MIS and the mainframe data base.

We call our solution "connectivity." Through our sophisticated IBM communications software, the multi-user, multi-tasking 6000 Series computer system acts as a node. It connects your end-users, your MIS department and the mainframe data base.

Leading edge systems from leading edge silicon. The 6000 Series gives you several big advantages. First, we make the MC68000 microprocessor family—the best UNIX* engine around. Then we vertically integrate the 68000 family into the system. But we don't box you in. The architecture is open, so you can add capability as you need it. And, since the 6000



you make contact.



Series is UNIX-based, you have access to hundreds of software applications.

Software that end-users want and developers need. The 6000 Series comes standard with all the software necessary to get started—spreadsheet, word processor, DBMS, data entry and communications. There's even software for information interchange.

And, to create your own software solutions, we can provide the development tools you need.

Finally, we provide the kind of full service and support that only a Fortune 100 company can offer. Our Customer Support Operation is staffed with more than 1,400 specialists in 175 cities across the country. We're ready 24-hours a day, seven days a week.

We're the contact you need. Prove it to yourself. For a limited time, we'll loan you a 6000 so you can make the contacts *you* need. Call us at 1-800-528-6050, ext. 1599, to see if you qualify. Or write us at Four Phase Systems, 10700 North De Anza Blvd., M/S 51-3E7, Dept. T, Cupertino, CA 95014.

From silicon to systems, we're the one solution.

MOTOROLA

Information Systems

Motorola and Ⓜ are registered trademarks of Motorola, Inc. Four Phase is a registered trademark of Four Phase Systems, Inc. *Unix is a trademark of AT&T Bell Laboratories.

way the programmer intended. It may not work at all. A program that isn't working properly might produce 1,000 pages of gibberish instead of the Year-End Profit Analysis Summary, or it may end abruptly before it has produced anything at all. The case of the abnormal end (or **abend**) is familiar enough to programmers that many not-so-technical terms are used to describe it: Programs die, blow up, cancel and crash, not to mention blow away, crap out and take a dump.

Whether the program's output is bad or nonexistent, the programmer must start the process of **debugging** the program. As the word connotes, this means getting the **bugs** out of a program, correcting the things that are wrong with it. If the program **abended,** the operating system may have issued an **error message** at the time of the abend that describes the problem.

If this is insufficient, the programmer may have to study a **dump.** A dump is a printed listing of part of the contents of computer storage just as it looked when the program failed. This listing bears little resemblance to the program as the programmer wrote it. It's just page after page of numbers — a symbolic rendering of the machine language of the computer.

For reasons explained in the next section, the numbers are not decimal numbers, but numbers in the base-16 or base-8 system. The programmer must find the offending code in this jumble and relate it to the original program. Needless to say, most programmers look forward to dumps as vampires look forward to dawn.

The languages used by programmers were designed to be understood by humans, not computers, so while a programmer has to know his language, it is rarely necessary for him to have a detailed knowledge of how a computer works. If you find the concepts discussed in this section difficult to grasp, don't feel badly; many DP professionals have the same problem. (Of course, there are plenty of people who find the concepts childishly simple, and loads of fun, too.)

You may have heard a computer described as a vast storehouse of switches, switches which may be on or off. The switches are actually electrical charges of one intensity or another, stored in the complicated circuits of the computer. Both the instructions executed by the computer and the data stored in external devices have this two-digit code of the switches — on or off, or as it is also conveyed, 1 or 0. Since everything the computer processes may be broken down to those two values, 1 and 0, it may seem the variety of information the computer can store and use must be limited — but this isn't so.

We are accustomed to using the base-10, or decimal, system of counting. It uses 10 symbols, 0 through 9, probably based on the fact that we have 10 fingers to count on (and which suggests, since we don't use 20 digits, that shoes were invented before the decimal system). With these 10 symbols, we can write down any number (limited only by our stamina). We understand that in the base-10 system, the rightmost number always means the number of ones; the next digit to the left means the number of tens; the third digit means the number of hundreds and so on. So we know that 237 in decimal is a shorthand way of saying (100 x 2) + (10 x 3) + (1 x 7).

Because the computer deals with only two different values, the decimal system is not a direct and convenient way to represent the contents of a computer. A binary (base-2) system often is used. In fact, the common name for those switches is bits, which is a contraction of binary digits. A bit may be on or off, 1 or 0. That's all.

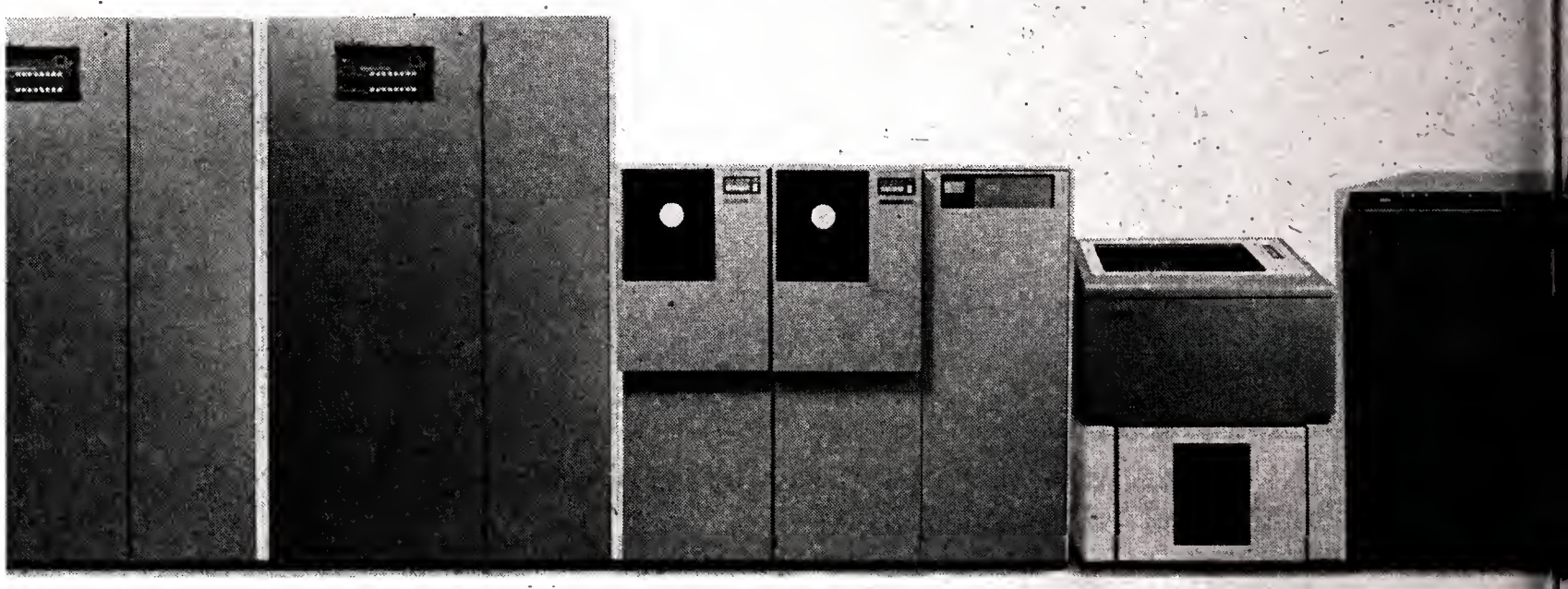
So how do we make a bigger value than 1 with only those two symbols? By stacking up symbols, much the way we do in decimal. In binary, each column will be a power of 2 instead of 10; so the rightmost digit will mean how many ones, the next digit to the left will mean how many twos, the next digit how many fours, the next digit how many eights and so on. The binary number 1010 means (8 x 1) + (4 x 0) + (2 x 1) + (1 x 0) or, in decimal, 10.

The binary number 0101 means (8 x 0) + (4 x 1) + (2 x 0) + (1 x 1) or what we usually call "five." Four bits allow us to make 16 different numbers. You may have noticed, though, that binary notation is not as concise as decimal; if we wanted to write numbers in the thousands or millions, we'd have so many ones and zeroes lined up it would be awfully inconvenient to read them.

Three numbering systems

Binary	Decimal	Hexadecimal	Binary	Decimal	Hexadecimal
0	0	0	1011	11	B
1	1	1	1100	12	C
10	2	2	1101	13	D
11	3	3	1110	14	E
100	4	4	1111	15	F
101	5	5	10000	16	10
110	6	6	10001	17	11
111	7	7	10010	18	12
1000	8	8	10011	19	13
1001	9	9	10100	20	14
1010	10	A	10101	21	15

If we said we have
display stations, print
flexible disks and



would you think we're

Good. That's exactly what we are prepared to do. Because not only can we promise a complete line of products designed to meet your performance and price needs, we can deliver it. Today.

We can meet your performance needs with tape drives that are setting industry standards for high reliability subsystems. With communications clusters that offer the broadest choice of ergonomically designed, easy to own PCM products.

That's why the contents of computer storage are sometimes symbolized by some larger base than binary: octal (base-8) or hexadecimal (base-16). Hexadecimal is not only more concise than decimal, but it translates very nicely from binary. For every four binary digits, a single hexadecimal digit (also called a hex digit or, rarely, a hexit) can be created.

Sixteen symbols are required in a base-16 numbering system: The symbols 0 through 9, plus A through F, are used. In this system, the rightmost column still represents the number of ones, but the next column to the left means how many sixteens, the next column how many two-hundred-fifty-sixes and the next column (take a deep breath) how many four-thousand-ninety-sixes. So the hex number 72A3 may be translated as (4096 x 7) + (256 x 2) + (16 x 10) + (1 x 3). Each column represents a power of 16. If this is beginning to seem a little murky to you, it will help to compare the numbering systems now:

After all this, it seems there is no way to convey anything but numbers in computer storage. What about the alphabet? Punctuation? The computer does more than process numbers, of course. So the hexadecimal numbers 00 through FF (0 through 255, in decimal), are understood to represent different characters. A set of symbols commonly used has the hex digits C1 represent the letter "A," C2 the letter "B" and so on. The same system uses 5B to mean "$" and 40 to mean a space. Each pair of hex digits is called a byte.

We know then that a byte contains two hex digits (or eight bits), that it will have a value from 0 to 255 and that it can be used to represent some printable character. Three bytes (or 24 bits) of computer storage would be necessary to store the word "cat."

It is not unreasonable to think of a byte as simply one character of storage and to forget about all the smaller components the byte can be divided into. If you think of bits ever again after this paragraph, you can think of them as on/off switches instead of binary digits (if you prefer). And take heart; I'm through talking about numbers.

Most of this article is concerned with what are called mainframe computers. These are large computers, which usually are capable of supporting multiple users, and which contain only the electronics necessary to process data — that is, any storage devices, terminals, card readers and so on are external to the computer; the computer itself tends to look like nothing more than a big metal box. Inside the mainframe are many circuits, logic boards, storage components and, usually, some kind of machinery for keeping everything from overheating.

A microcomputer, in contrast, typically contains a single microprocessor, a compact module about the size of a stick of gum, instead of the many components found inside a mainframe. Any of the personal computers on the market are micros, as opposed to mainframes. In between these two are minicomputers, which sometimes are a small collection of microprocessors combined in such a way that they act like a mainframe. To further confuse matters, some of these minis are powerful enough to be called superminis, some of which have greater processing speed than some mainframes. But generally speaking, mainframes are the most powerful computers, microcomputers are the least powerful, and minicomputers are the machines in between.

Microcomputers are much simpler to design, build and manufacture than mainframe computers. It is possible to buy the necessary parts to build a microcomputer for a few hundred dollars, put them together and sell the assembly for thousands of dollars — and many individuals have done just that. Some large and famous microcomputer companies started as tiny businesses in garages and basements.

Another thing about micros worth noting is that it doesn't require much knowledge of computers to build one; what is more important is a knowledge of electronics.

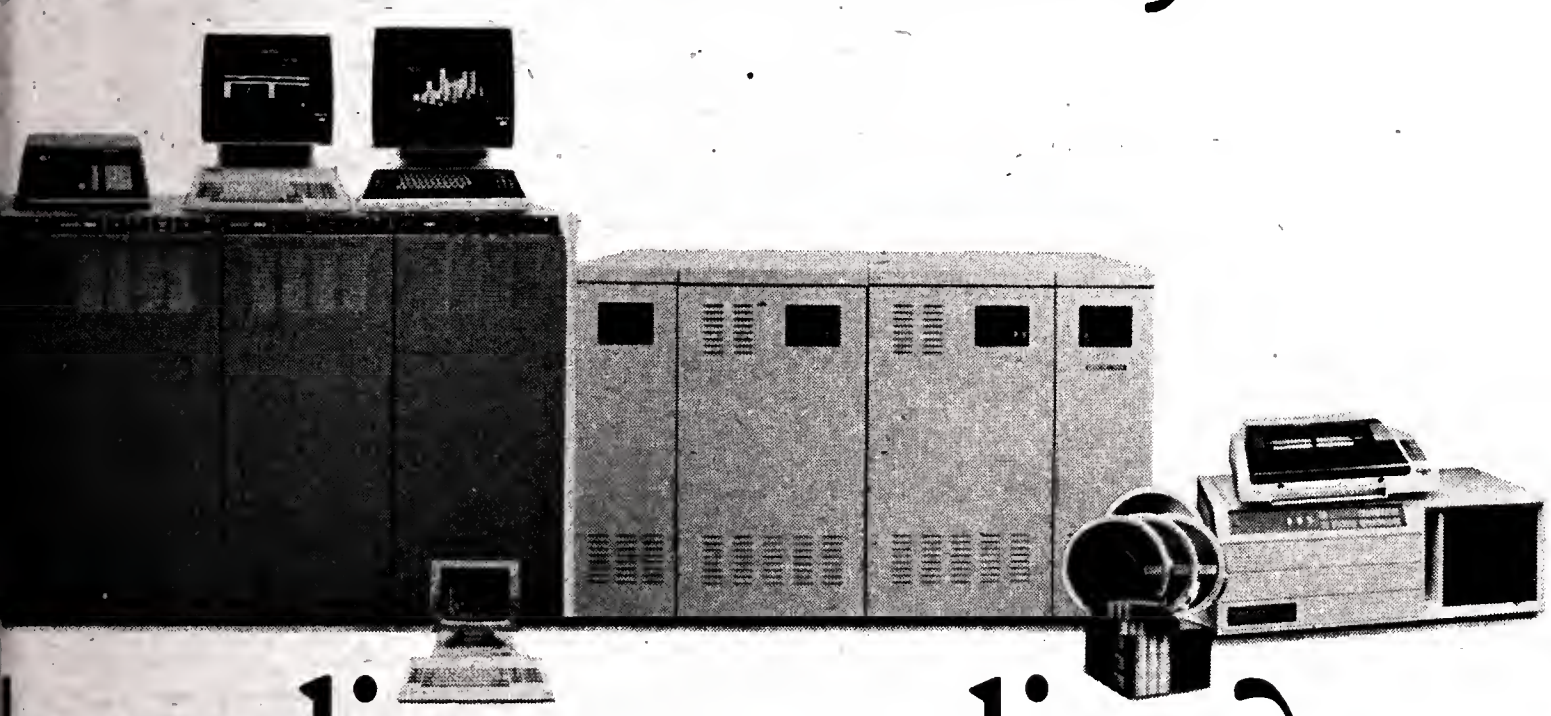
As a result of these things, the language of microcomputers is very often different from the language of mainframes. For example, a mainframe operator performs an IPL (Initial Program Load) to start the mainframe, whereas the owner of a personal computer will boot the system on the micro (from "bootstrap," which some early microcomputer designer imagined the micro pulling itself up by).

The primary device for storing information used on a micro is likely to be tape or disk (just like the mainframe), but the disk is often really a diskette or floppy disk (a flat sheet of plastic with a special recording surface, contained within a plastic envelope), and the tape can be a perfectly ordinary cassette of the same sort used to record music.

Because some microcomputers were designed specifically for home use, they have special features to make them easy to use. One of these is called a mouse, which is named for its appearance. A mouse is about the size and shape of half a tennis ball and is connected to the micro with a wire — which suggests a tail. It can be pushed around on any flat surface (like the desk the micro is sitting on), and moving the mouse causes some movement on the computer screen.

On the screen might be a list of names; to pick one, the computer user would roll the mouse around until an underscore character on the screen was under a certain name, then punch a button to let the program know a selection had been made. The program then might display information about the person selected. (By the way, that underscore character is known by most

disk and tape drives,
ers, computer tapes,
other accessories,



handing you a line?

And with high performance disk drives whose greater flexibility in features are now being acknowledged in the newest offerings of the "Industry Leader."

We can meet your price needs through the Memorex Finance Corporation, which offers you total financing flexibility. From quantity purchase programs to competitive leasing plans, we can suit your company's budget and schedule demands.

So whether you're looking for disk or tape subsystems, printers, display terminals and controllers, or computer media, you can have it all. And you can have it all now.

You see, only Memorex can hand you this line. A complete one.

The alternative.
When it matters, make it Memorex.™

MEMOREX
A Burroughs Company

© 1985 Memorex Corporation Memorex is a registered trademark of Memorex Corporation

terminal users — not only microcomputer users — as a cursor.)

Sometimes pictures will be displayed on a microcomputer's screen instead of words. With a system like this, the user might move the cursor to a picture of a printer, rather than typing in commands to initiate a print operation. It is becoming common to refer to these pictographs as icons.

Some micro manufacturers have taken this a step further: Instead of moving the cursor to the icon one wants to select, the micro user can merely touch the desired symbol with a fingertip. Touch screens like this are believed by some to be the most natural way for a human to use a computer and, therefore, may be used eventually for all computers. The touch screen is covered with a touch-sensitive file, or the frame around the screen contains lights and sensors that a fingertip will block.

Whether the touch screen is a hint of the computer's future or not remains to be seen. However, graphics (like icons) will certainly continue to be desirable. Machines allowing the user to create pictures, graphs, architectural renderings and so on are relatively common. The person who creates such graphics usually wants to immortalize them and so requires a special kind of printer.

The most popular type of printer for attachment to a micro is a dot matrix printer. The dot matrix refers to the device that actually strikes the print ribbon or paper: It consists of 35 or more needles, each of which can be retracted or extended to form different characters out of the resulting dots. This allows a printer to be very fast, because the movement of the print head is only back and forth across the paper.

Crude graphics are possible with this type of printer, because it can be programmed to print dots anywhere on a page. Pictures composed of dots, like those printed in newspapers, are possible; however, simple bar charts, pie charts and special lettering are more common applications.

For the printing of more sophisticated graphics, a plotter is used. This is typically a very expensive and fairly large printer that prints with one or more fountain-pen-like devices moving over a stationary sheet of paper.

Word processing applications that demand letter-quality printing (like a business letter, a resume or a freelance writer's manuscript) require a third kind of printer: a daisywheel printer. The daisywheel, usually made of plastic, is mounted between a hammer and a print ribbon. It consists of many spokes, and at the end of each spoke is a raised character, exactly like a hammer on a typewriter.

The wheel spins around when the printer is in use. When a daisywheel printer prints the character "a," it waits until the "a" spoke is in front of the printing hammer, the spinning pauses for an instant, and the hammer comes down.

As a rule, these letter-quality printers are slower than dot matrix printers, because the print mechanism not only moves back and forth across the paper, but it must wait momentarily for a character to come into position in front of the hammer. Their advantage is the appearance of their printing, which tends to be as good as that produced by the best electric typewriters.

All these things may be of interest to a DP professional, even one concerned only with mainframes, because it has become desirable to establish communications between micros and mainframes. Departments of large companies and corporations have purchased microcomputers to help them do their work and are now discovering it would be a great advantage to have direct access to data stored on the mainframe system at the main office; main offices are discovering it is to their advantage to have access to their satellite micros.

For example, an insurance agent in Indianapolis might work for a company based in Chicago. Every month, the agent is mailed a list of rates for each kind of insurance policy, as calculated by the Chicago office. The agent types the rates into his microcomputer once a month, then uses the micro to create policy declarations for new clients. Then the agent prints a list of new policyholders and mails the list to Chicago.

Obviously the ideal situation would be for the agent to call in to his Chicago office's computer every morning to get the current rates, which would be downloaded to his microcomputer. When he typed in a new policy on his micro, the ideal situation would be for that information to be automatically uploaded to the mainframe in Chicago.

Because this ideal is slowly becoming reality, DP professionals who are accustomed to mainframes are learning the language of micros and vice versa.

About the author

Bruce Kula is currently a software engineer for Paradyne Corp. in Largo, Fla. He has been a truck driver and a high-speed planer operator in Wyoming and a systems programmer near Detroit. He now lives and writes on the shore of the Gulf of Mexico.



Enter a Powerful New Age of CICS Performance Management

Shed new light on CICS performance with the first CICS management system providing sophisticated online and batch capabilities.

THE MONITOR FOR CICS™ gives you **all the performance control you'll ever need** for efficient operation, swift reaction to problems, accounting and capacity planning based on real needs.

With an easy-to-use, menu-driven format, THE MONITOR FOR CICS™ features:

- Data collection with online browse, batch report writer and historical archiving
- SUPERTRACE—the first application tuning tool
- Real-time graphic monitoring with optional color
- Complete file and database analysis

Enter a powerful new age of CICS performance today. For more information about THE MONITOR FOR CICS™ contact:

Landmark Systems Corporation

6142-B Rose Hill Drive
Alexandria, VA 22310
(703) 922-8652

800-227-8911

VAX/VMS
ON-SITE COURSE
($3500)

1. VAX/VMS Terminology
2. DCL Commands
3. Program Development
4. Symbolic Debugger
5. Run-Time Library Calls
6. Command Procedures/Batch

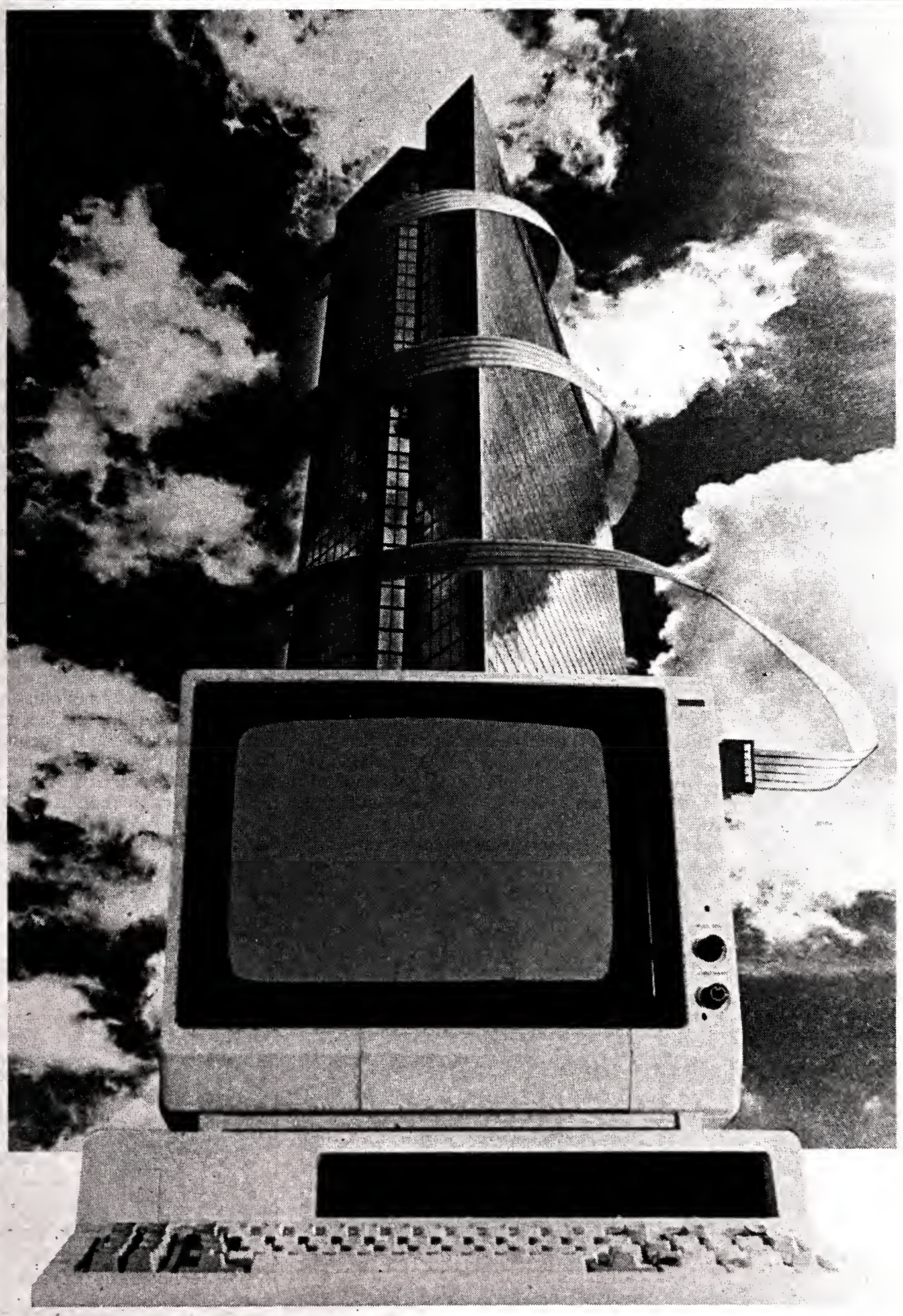
Walter J. Gallant
Mini & Micro Educ. Services
Portland, Maine 04102
(207) 773-6316 Ext. M4573

Special Report

Computerworld
April 29, 1985

Micros in Big Business

Changing the corporate landscape



CW PHOTO BY G. O'CONNELL AND P.C. LADOUCEUR

Inside:

SR/2
Micro strategies: AT&T, Apple and IBM

SR/2
Personal computer phone systems

SR/4
IBM's scenario for the micro-mainframe link

SR/8
Curbing software piracy: Can site licensing help?

SR/10
Why micros are hastening the spread of telecommuting

SR/24
Maintaining microcomputer software

Special Report

INSIDE



Personal computer phone systems search for a foothold in the corporate U.S./**SR/2**

An analyst questions if users will go for IBM's plan to tie Personal Computers to its CPUs and applications/**SR/4**

Many vendors are scrambling to adopt a user interface technology developed at Xerox in the early 1970s/**SR/7**

In the battle against piracy, software licensing is one option managers may want to consider/**SR/8**

A firm cut its telecommunications costs by 90% after switching from dumb terminals to micros/**SR/9**

Communication is key for a calm computer room environment/**SR/12**

A sporting goods retailer is using a micro-mainframe link to increase budget efficiency/**SR/21**

A firm that supplies parts for the space shuttle uses terminal emulation boards for micro access to CPU data/**SR/22**

MIS professionals must consider the ramifications of micro-mainframe communications/**SR/23**

Maintaining microcomputer software can teach DP managers about mainframe software maintenance/**SR/24**

A Big Eight accounting firm's auditors take micros to clients' offices/**SR/26**

A survey of savings institutions showed preferences for hardware and software purchases and training needs/**SR/27**

There is a growing interest in the new MIS position of micro manager/**SR/28**

Is an information center the answer to microcomputer security?/**SR/36**

A beta test site developed two timesaving applications for a micro-mainframe package while running the software in test mode/**SR/46**

Touch-screen input is emerging from vertical markets as the mainstay of video-based training systems/**SR/48**

A partnership between MIS and user groups can foster a solid microcomputer policy/**SR/54**

The price, performance and service of multiuser systems offer attractive alternatives to local-area networks/**SR/55**

Managers responsible for bringing micros into the workplace must develop a matrix of management skills/**SR/63**

AT&T, Apple, IBM gear up for

By Aaron Goldberg
Special to CW‡

With the war in the personal computer market fast approaching the apocalyptic battle, it is an important time to understand the strategies and weapons that the major opponents have at their disposal. The present conditions of this conflict have left some of these competitors battle weary or bristling to fight. One thing is for certain, the winner or winners will take home some lucrative spoils.

Each of the three vendors analyzed here, namely AT&T, Apple Computer, Inc. and IBM, is notable not entirely for its present position in the market, but rather for the role that each is playing in the marketplace.

Each has its own operating environment (AT&T with Unix, Apple with Macworks and IBM with PC-DOS), and each company has many resources that it can use to sell the personal computer products that it develops.

It will be an interesting battle, with each opponent having some clear advantages and disadvantages in the competitive marketplace.

Goldberg is director of microcomputer systems services with International Data Corp., a Framingham, Mass.-based market research firm.

AT&T

AT&T is the sword of Damocles that has been hanging over the DP industry's head since Judge Harold Greene divested the company. The promise of the deed, however, has been far greater than the deed itself. AT&T has yet to make its impact.

The company started out by selling an IBM-compatible system for which Olivetti Corp. was an OEM. While this system is a reputable product, AT&T's real entry into the market was with its Unix PC, which has been hailed by many as one of the better personal computers.

AT&T has many market advantages. As owner of the Unix operating system, AT&T is finally gaining support of its System V from the majority of third-party software suppliers. In addition, the Unix PC introduction made AT&T the only one of the big three vendors whose major operating system is compatible with multiuser system operating environments. This is a tremendous advantage in the small-business market, where the upgrade from a micro to a multiuser system is still a major problem.

AT&T has also developed a good user interface for Unix that allows the nontechnocrat to use the system in an economic manner.

The organizational strength of having a large direct sales force already in place and a customer base from the private branch exchange days are also to AT&T's advantage. And the stability of the AT&T name cannot be underestimated in these days of shakeouts, Chapter 11 of the Federal Bankruptcy Act and various other corporate "suicide" techniques. In addition, because its large sales volume from other lines of business contribute to profits and provide working capital, AT&T has the luxury of being able to learn in the personal computer market without the added pressure of seeking instant profits.

On the negative side, AT&T has yet to prove itself to be a major factor in the computer market in general. Its 3B series has received less than enthusiastic responses from customers, and the 6300 does not disguise well the fact that it is an OEM product. The company also suffers from an image problem. Many perceive AT&T as either a less than dynamic monopoly or an information processing company searching for identity.

Apple

Apple is the company that people love to talk about. Whether it is the Macintosh division's 15-minute em-

Personal computer phone tools await

By Eric Bender
CW Staff

If managers knew what was good for them, the theory goes, they would all want an integrated voice/data terminal — a single desktop device to take them through their daily phone calls and computing tasks, handle scheduling and give other benefits on the side.

More than two years ago, vendors began to blend IBM Personal Computer capability into this cheerful scenario. Currently, more than a dozen products (either add-ons or complete systems) are claimed to combine IBM Personal Computer functions with integrated voice/data communications.

In recent months, major players have joined the fray. One of them, Compaq Computer Corp., predicted that overall sales of this class of machine will approach 100,000 this year and rise to one million in three years.

However, just about everyone agrees that the personal computer phone systems already shipping have made relatively little headway in corporate America to date.

The biggest stumbling block, vendors and analysts say, has been persuading customers that the devices meet important needs that are not addressed elsewhere at a reasonable cost.

More end-user education needed

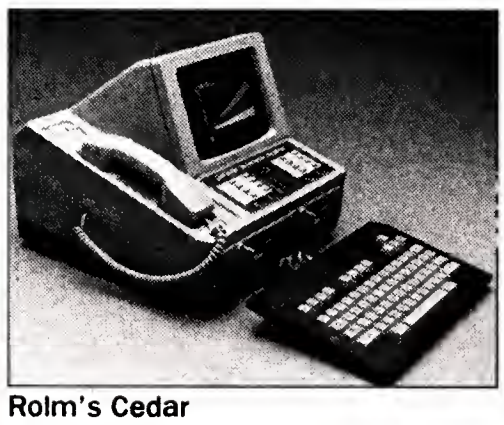
The products "take a lot more end-user education than we'd thought," said Don Cooper, marketing vice-president at Zaisan, Inc. in Houston, which introduced an IBM Personal Computer-compatible voice/data system last July. Market growth is "not nearly as fast as the prognosticators suggested," he said.

Stephen Caswell, editor of "Electronic Mail and Microcomputer Systems" newsletter in Toronto, was more blunt: "Vendors have all these products, but users don't have much interest," he said. Instead, personal computer users buy a modem and a desktop organizer package, such as Borland International's Sidekick, that offers many similar features, Caswell suggested. "Why would anyone in his right mind go out and pay hundreds of dollars extra so [the product] runs a little smoother?"

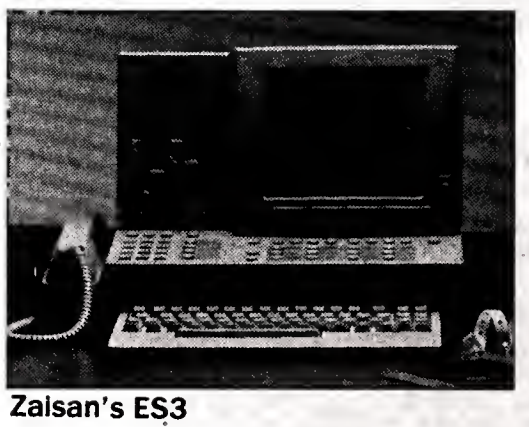
Additionally, users complained that the first-generation personal computer phone products lacked the general polish and tight integration of functions that were their main selling points. For example, to enter a single telephone listing on the Cosystem offered by Cygnet Technologies, Inc. of Sunnyvale, Calif., users were forced to load a separate program.

Other technical limitations often arose when the new equipment tackled multitasking. If connected to two telephone lines or integrated into a proprietary digital switch, the devices accommodated simultaneous

A sampling of the personal computer phone



Rolm's Cedar



Zaisan's ES3



Cygnet Technologies' Cosystem

Special Report

microcomputer war

Personal computer worldwide unit shipments

Vendor	1983	% Growth	1984	% Growth	1985
IBM	676,500	179%	1,888,000	31%	2,475,000
Apple Computer, Inc.	790,000	74%	1,375,000	29%	1,775,000
AT&T	0	0%	30,000	233%	100,000

SOURCE: INTERNATIONAL DATA CORP.; CW CHART

ployee back massages and first-class travel to anywhere or the new interface ideas provided in its latest product line, the company has no lack of press. But behind all of this flash is a computer company trying to take market share from one of the largest companies in the world.

Apple's advantages in the personal computer war are substantial. The company has developed a strong following in both its own and other user camps. Many personal computer users who started computing before 1981 can claim that they learned computing with an Apple machine.

Apple's image, created by clever marketing, has endeared them to the computer neophyte and the intimidated prospective buyer. In addition, the Macintosh Office concept is the only single-vendor offering of a complete personal computer/local-area network/Laser printer workstation now shipping that actually works.

Also, the strength of the Apple II family cannot be overlooked. Although the current emphasis of this product line is on the consumer market, there are still many Apple IIe products being sold for corporate use, and the software base is more than able to handle any challenge.

The corporate advantages for the company are only now starting to fall into place. As John Sculley guides the company from gangling adolescence into maturity, the internal structure of the company will flower. The skill of Apple's upper-level staff members — including, of course, Sculley — as marketers and builders of opportunities bodes well in the long term, although corporate maturing is still a key factor in the company's future prognosis.

The disadvantages Apple faces are serious. At the present time, the company is a single-product firm centered in the personal computer market. While its position in this market is strong, Apple may find it difficult to match the high-flying history of the early 1980s as margins get squeezed and the growth rate slows. In the past, the company has also set itself up as an IBM antagonist, and in the process, it has antagonized many large user firms. Although this attitude is less prevalent now, first impressions change slowly.

Since Apple is a comparatively young company with a management structure that is still evolving, its management must balance its attentions between the personal computer division (the Apple II product line), which is revenue-producing, and new ventures into business computers (the Macintosh Office concept). If this balance is not maintained, one result could be a significant squeeze on working capital and cash flow.

A stumbling block here is that Chairman Steven Jobs runs one division,

See **APPLE** SR/6

customers

voice/data calls. But juggling several personal computer jobs in addition often proved impossible.

Confusion in the distribution channels created other problems. Both traditional telephone sales representatives, who typically market the system products to customers without microcomputers, and computer dealers who sell peripherals to personal computer users had difficulty figuring out how to push the new devices.

Despite all the potential drawbacks, many users said they were pleased with the new personal computer phone systems.

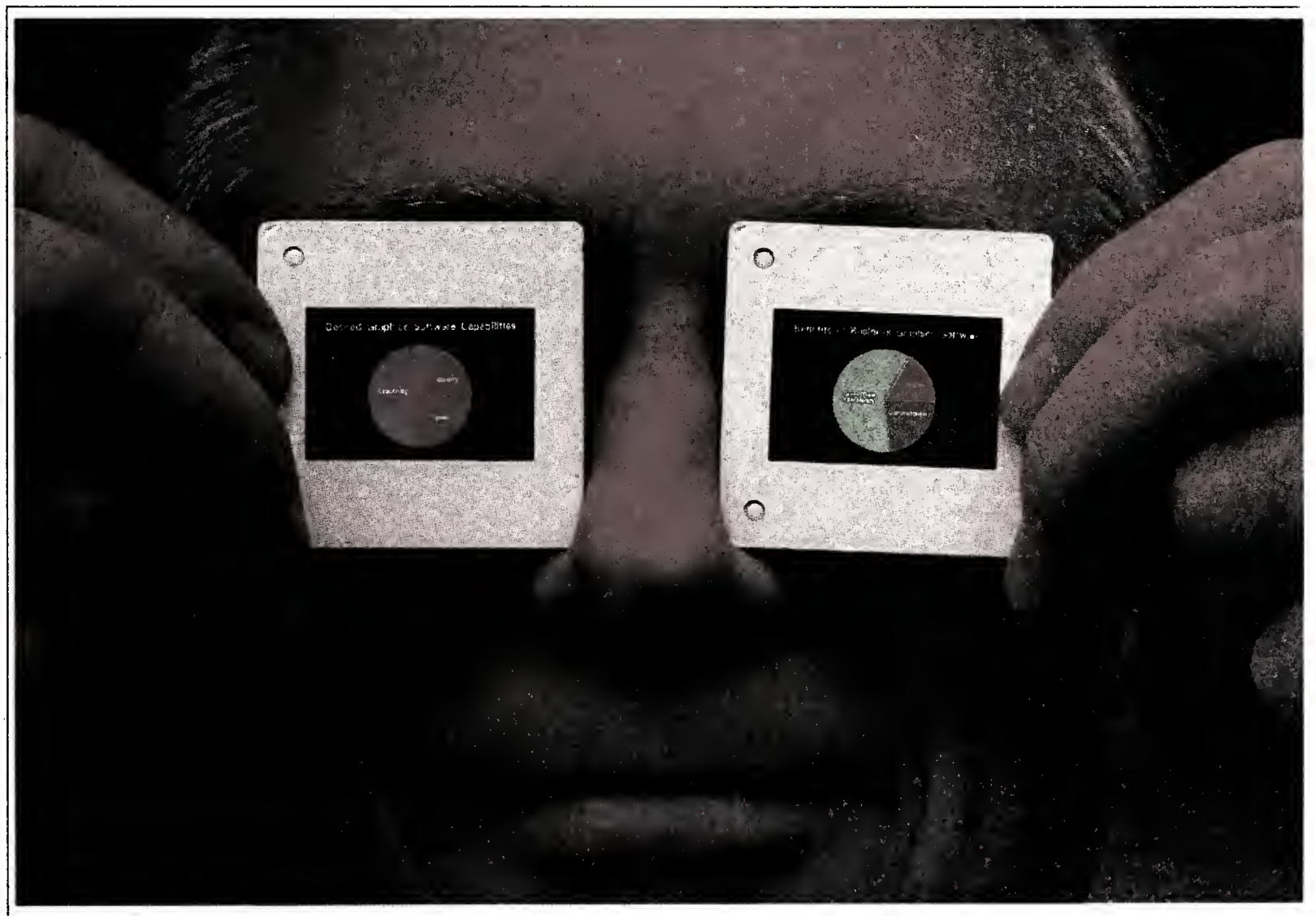
One large Midwestern aerospace firm with thousands of IBM Personal Computers has installed 10 Zaisan, Inc. ES3s with satisfactory results, according to a communications branch manager of the firm. He described the ES3 as a good buy for the money, although he said "it's hard to

See **PHONES** SR/5

competition



ITT's Xtra



AT LAST, A BUSINESS GRAPHICS SYSTEM THAT KEEPS YOUR BUDGET IN FOCUS.

Introducing Presenter™PC Business and Presentation Graphics software—the sophisticated software package for use with your IBM® or COMPAQ® personal computer and a graphics adapter card.

Basically, PresenterPC software enables the user to create impressive business charts and graphs at the computer, then output them to film.

This is a *very* cost-effective graphics solution and you can be confident it will allow your company to produce the highest quality presentation slides.

Through a simple telephone transmission or by mail, your graphics are quickly transformed into bright and crisp, high-resolution slides or overheads.

All at a very affordable price. And for you this means increased productivity, lower operating costs and excellent quality control. Because PresenterPC generated graphics can be created much faster than manually prepared slides.

Revisions are also faster and easier, and changes can be seen on the screen as they are made. Data can be transformed into a variety of charts directly from DIF® files, too, so there's no need to re-enter it.

To get a clearer picture of what PresenterPC can do for you, simply call the toll free number ***1-800-228-5000*** and get a demonstration diskette for $19.95.

Or mail the coupon below.

Mail to: DICOMED Corporation, P.O. Box 37207, Omaha, NE 68137

Name_____

Company_____ Title_____

Address_____

City_____ State_____ Zip_____

CW-1

Telephone ( ) _____

☐ I'm interested in PresenterPC software. Please send me a demonstration disk and bill my ☐ MasterCard ☐ Visa

Account #_____ Exp. date_____

☐ Please send me more information on PresenterPC software.

IBM® is a registered trademark of International Business Machines, Inc. COMPAQ® is a registered trademark of COMPAQ Computer Corporation. DIF® is a registered trademark of Software Arts Products, Inc.

© 1985 DICOMED

DICOMED Corporation, 12000 Portland Avenue South, P.O. Box 246, Minneapolis, MN 55440-0246

DICOMED

Special Report

IBM's network scheme prompts critical question: Will

By Brian Jeffery
Special to CW‡

After nearly three years of selling personal computers largely as stand-alone business tools, IBM has finally come up with a reasonably coherent software scenario for tying personal computers to its mainframe systems and applications.

The scenario, announced in October of last year, is built around IBM's Distributed Office Support System (Disoss), Professional Office Systems (Profs), System/36 and Personal Computer family. Links between Personal Computers and hosts are provided by Personal Services/PC, Profs/Personal Computer Connection, a new set of Displaywrite word processing software for Personal Computers and hosts and a group of products for tying Personal Computers to IBM's recommended departmental system, the System/36.

The good news is that IBM has finally come up with a workable solution for personal computer-based office automation. The bad news is that committing to the IBM scenario is likely to take end users in directions they do not want to go. In particular, IBM's evolutionary scenario is likely to lead end users into a progressively more complex, inefficient and expensive Systems Network Architecture (SNA)-based environment.

The keynote of the IBM approach is that it is evolutionary. None of the IBM products are new: Disoss is more than a decade old, Profs dates from the late 1970s, the System/36 is a repackaged version of the 1977 vintage System/34 architecture, and the Displaywrite series is repackaged Displaywriter Textpack word processing software.

Also of note is that the scenario pushes end users heavily into the 3270 world, with 5250 series terminal emulation also required to attach to the System/36. SNA is also much in evidence. Disoss is an SNA product, and compatibility between the various components of the IBM scenario has been implemented through the SNA-based Document Interchange Architecture and Document Content Architecture. Future enhancements to the IBM scenario are also likely to be oriented toward SNA and the 3270 interface.

SNA advantage

There is a superficial advantage to this. IBM claims some level of SNA commitment by more than 60% of its large system end users, and for many, the extension of SNA to include Personal Computers will seem attractive in that it is at least coherent and compatible with IBM host environments.

Successive software overlays on the SNA networks will provide the ability to transfer documents across most of the IBM product range. Image, high-resolution color graphics and, ultimately, voice traffic will all be folded into the SNA environment. It will all be a lot easier than trying to put together this type of scenario in a multivendor environment.

Jeffery is responsible for the IBM Watch program run by International Technology Group, a Palo Alto, Calif., consulting firm specializing in competitive analysis.

> *The trade-off for compatibility will be an ever-increasing processing overhead; under IBM's latest office systems software lies a bedrock of CICS, IMS and Vtam.*

Unfortunately, IBM's solution may be easier, but it also limits the options available. It means commitment to IBM host architecture and applications as the main component of office automation, and as the IBM scenario progresses, it is likely to mean that hosts will determine patterns of personal computer usage rather than vice versa. It also means a long-term commitment to SNA.

By the time that IBM has finished adding further software overlays to support office automation functions, integrated voice traffic and the like, it is going to look even more inefficient. The trade-off for compatibility will be an ever-increasing processing overhead; under IBM's latest office systems software lies a bedrock of CICS, IMS, Vtam and so on.

In the long term, there is also the disquieting possibility that IBM may start hiking SNA software prices much as it has done for 370 series host users with its costly MVS/XA equipment. This may not be planned by IBM now, but SNA is central to IBM's plans; the company has said that it is looking for major increases in software revenue this decade, and an end-user base locked into SNA would certainly be a temptation. By the end of the decade, SNA software costs for the average end user will probably be at least several times greater than their present level, and

SAMNA EXPLODES SOME MYTHS

"PC'S JUST CAN'T MATCH THE POWER OF DEDICATED WORD PROCESSORS."



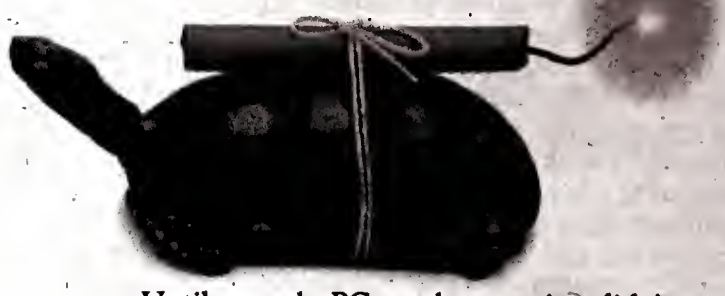
This myth is well grounded in fact. Because before SAMNA, it was true. But SAMNA Office Automation software can make a microcomputer outperform even the most advanced dedicated word processors in power, functionality, and user interface.

SAMNA delivers high-powered word processing features like screen-to-paper fidelity, with on-screen display of special formats. Split screen editing. Easy addition, deletion, and movement of text. Automatic merging of names and addresses into form letters. Automatic pagination and footnoting. Index and Table of Contents generation. Glossary of standard paragraphs with automatic insertion. Automatic search and replacement. Outline generation. Automatic spell checking and correction. Electronic fold to see both sides of a wide page at the same time. Zoom that shows the layout of a large page on your screen. Three levels of Help that guide you through every command. Extensive documentation and support. And much more.

SAMNA also offers the Seamless Integration™ of other functions for your other business needs. So it doesn't just match the performance of these old standards.

SAMNA blows them all away.

"PC WORD PROCESSING SOFTWARE ISN'T FAST ENOUGH FOR ME."



Until recently, PC word processing didn't run at hare-racing speed.

But SAMNA's Turbo-powered software is fast enough for even the most demanding word processing users. One demonstration will prove it to you. Very quickly.

Special Report

micros suffer from hosts' inefficiencies?

it could be a lot worse.

There are alternatives, of course. Seen in historical perspective, the mid-1980s are going to be a very crucial time for determining the shape of information processing use. Since the late 1970s, the development of the large-organization personal computer market has meant a move away from the old mainframe-based hierarchy and created large-scale decentralized processing for the first time.

Personal computer products and technology have been more closely tuned to real user requirements and work patterns than conventional DP systems have been; personal computers are used predominately for standalone purposes. As end users move toward personal computer-to-host links, the manner in which these are affected is going to determine the pattern of information processing in the average large organization for a long time to come.

A time for questions

Perhaps now is the time to be posing some very basic questions. Are personal computers merely intelligent terminals for accessing hosts? Or should central hosts and other systems be regarded as an infrastructure supporting a personal computer-based end-user interface?

The difference involves an important nuance. If the usefulness of a personal computer is taken as the starting point, an information processing environment may be built up that focuses on delivering information and capability to users in a manner which responds to their real requirements.

If the personal computer is a terminal, the emphasis is more on central applications, and the requirements of host compatibility start to become the No. 1 issue. An evolutionary, compatible progression, such as that which IBM offers, is likely to be the easier option. However, the price will halt the possibility of a more decentralized, user-oriented way of structuring large-organization information processing, at least for the time being.

PHONES from SR/3

talk people [in a large corporation] out of an IBM Personal Computer for [one from] a company named Zaisan."

The manager originally intended to give the new desktop micros to directors and vice-presidents. However, the systems lacked some fancy telephone features, and the speakerphone was not quite up to the job, so the machines ended up with engineering and procurement groups, he said. "[The personal computer phones] still need some work, but they're going in the right direction," he concluded.

General Homes in Houston, which bought about 50 earlier Zaisan voice/data terminals to be used by its executives and at field locations, plans to upgrade about a dozen terminals to ES3s this year, said Ken Caracci, director of information systems. This will allow current users to move into personal computing "without trauma," he said.

General Homes also evaluated Rolm Corp. personal computer phone equipment, tailored to the Rolm CBX digital switch, but turned it down for cost reasons, Caracci said.

Cedars, Junipers find home

Iomega Corp. of Ogden, Utah, however, is finding a role for Rolm's Cedar personal computer phone and its Juniper add-on to the IBM Personal Computer, according to David Norton, vice-president for systems and administration. He said he expected about 26 Cedars and 50 Junipers to be installed by year end.

The company, which supplies computer components and peripherals, needs "an array of workstations," Norton said. Iomega considered meeting these needs internally, but found the Rolm alternative would cost about only 10% more. "We were willing to pay a percentage over to have a proven system instead of a mix and match and hope [one]," Norton said.

Iomega is giving Rolm Cypress voice/data terminals to executives, "who fundamentally require information," Norton said. Cedars are being placed with secretaries and other employees for handling letters or small computing needs. Junipers end up in engineering and financial groups with strong analytical needs. The company's Prime minis and dumb data-entry terminals also are hooked to the Rolm digital switch.

Rolm product suite

Like Iomega, Savers Federal Savings & Loan Association in Little Rock, Ark., is installing Cedars and Cypress as part of a suite of Rolm products, said Michael Flynn, assistant vice-president and telecommunications manager.

Currently, eight Cedars are installed, and they are appropriate "for a person who needs more than a smart terminal; more computer horsepower," he said. In IBM 3278 emulation mode, they access the association's IBM 4341 mainframe through the Rolm Gateway.

Savers has bought 20 Junipers for Personal Computer XT users but has installed only two on an experimental basis. One reason is that Rolm did not build in full document-file communications capability, preventing users from sending documents directly through the CBX for output on laser printers, he said. "It's one of those little things that takes time to work out."

ABOUT WORD PROCESSING.

"INTEGRATED SOFTWARE PACKAGES AREN'T WORTH A DAMN BECAUSE THEIR COMPONENTS AREN'T WORTH A DAMN."



Integrated software packages fall down on the job because they're just spreadsheets with a little word processing tacked on. And that's not how you work.

You work with words: reports, briefs, plans, analyses, memos, projections...even the ones with pages of numbers need text to make sense of them. And that's why SAMNA+ succeeds where the integrated packages fail. SAMNA+ is true office automation in a PC software package. It's word-based, like business. Developed from powerful, full-featured SAMNA word processing, SAMNA+ has Seamless Integration™ so you can work with text *and* five function math, interactive spreadsheet, Word Base Manager,™ free form line drawing, list management, or spelling checker as you need them. Without changing programs.

Just say the word, and Word Base Manager™ will locate it.

Only with SAMNA+'s Word Base Manager™ can you manage huge quantities of words as easily as you process them. Just type in the word, date, or phrase you're looking for and Word Base Manager will find the information for you. Every reference, everywhere on the disk. No matter how many times it appears, or how or where it appears.

The interactive spreadsheet is state-of-the-art, so you can change a number in the spreadsheet and have the resulting change automatically appear in the text. SAMNA+ also accepts ASCII files directly from other software. So you can replace those integrated packages with SAMNA+ and get some work done at last.

WANT TO KNOW MORE ABOUT THE POWER OF SAMNA? ORDER A SAMNA SAMPLER DEMO DISK.

CALL 1-800-831-9679

8AM–8PM, EST, Mon.–Fri.

CW429

Or write:
SAMNA Corporation
2700 N.E. Expressway
Atlanta, Georgia 30345

Name _____

Address _____

City _____ State _____ Zip _____

Enclosed is $_____ for _____ SAMNA Samplers at $14.95 each.

SAMNA

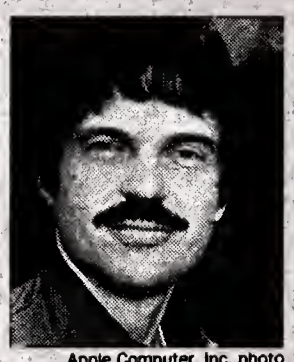
SAMNA Corporation, 2700 N.E. Expressway, Atlanta, GA 30345
(404) 321-5006

SAMNA is available for IBM PC, XT, IBM-compatible, TI Professional, and DEC Rainbow microcomputers. Spreadsheet available only in SAMNA +™

The following names are trademarks of the following companies: DEC and Rainbow, of Digital Equipment Corporation; IBM, of International Business Machines Corporation; 1-2-3, Symphony and Lotus, of Lotus Development Corporation; Framework, of Ashton-Tate Corporation; TI Professional, of Texas Instruments, Inc.; Wang, of Wang Laboratories.

Special Report

Development of user-friendly system goal in design of Smalltalk


Apple Computer, Inc. photo
Kay

Alan C. Kay, now an Apple Computer, Inc., Apple Fellow, designed the Smalltalk programming language at the Xerox Corp. Palo Alto, Calif., Research Center in 1971. His aim was to provide a development environment that would allow programmers to create truly user-friendly applications. Kay and his colleagues had discovered that the way in which a user interacted with a computer system was often more important than the computations the computer performed.

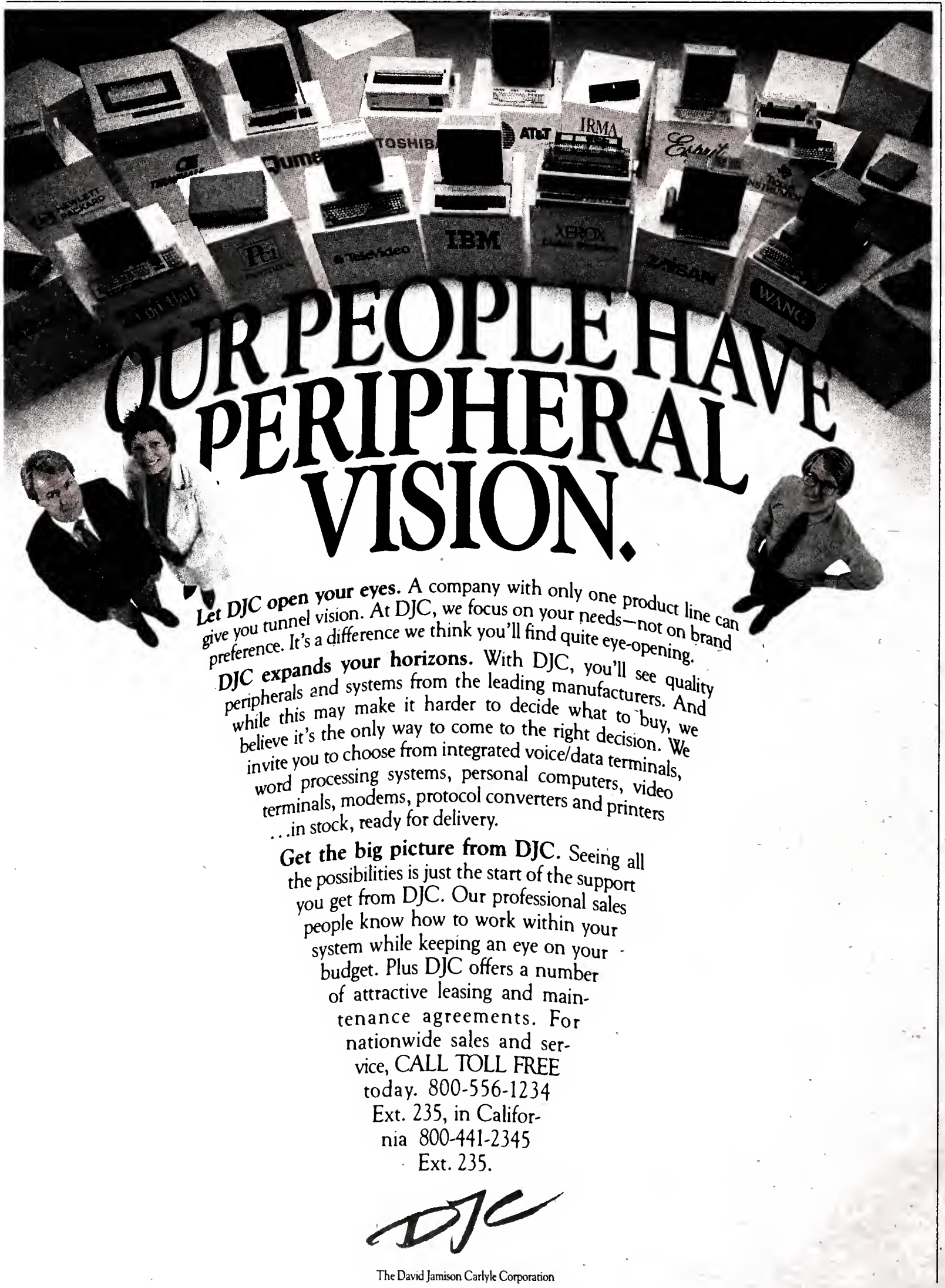
Smalltalk was designed to eliminate modes in computer systems. The typical interactive program of the early 1970s required the user to be in edit mode to modify text, in command mode to copy a file and in execute mode to perform calculations.

The user spent much time and used many keystrokes switching back and forth between modes. In addition, transferring data from one application to another, if it could be done at all, was performed via time-consuming disk transfer programs.

Smalltalk allowed applications designers to eliminate modes for their programs by having all functions, such as editing, file copying and computations, resident in memory and accessible with a single keystroke. Multiple applications were represented as a set of areas, or windows, on the video display.

Smalltalk also used the concept of cut, copy and paste among different applications. This concept allowed users to visualize each application as a piece of paper, a portion of which could be cut out and pasted onto another piece of paper in a different application.

The addition of icons to represent computer functions visually and a mouse to point to the icons in Smalltalk's applications resulted in a revolutionary way for users to interact with computers. This revolution, begun in the early 1970s, is just now beginning to reach the mass market of computer users.



APPLE from SR/3

which may result in a disproportionate distribution of company resources. The attention Apple directs to corporate culture rather than profit it could be dangerous.

IBM

IBM hit the ground running in the personal computer market and has not slowed since 1981. While this market dominance and revenue-building trend is not likely to continue in 1985, it is not expected that IBM will suffer more than either Apple or AT&T. The company is, however, in the process of having to introduce a product line this year, which is not an easy task. Despite this, sales of Personal Computer products should rise more than 30% this year, and their position in the larger firm should be solidified.

The advantages of the Personal Computer family are many. The most important of these is the support that the company receives from third-party software and hardware suppliers. This has allowed the Personal Computer to be used for nearly all applications. Also, the IBM Personal Computer AT is a state-of-the-art product.

The advantages of IBM as a corporation is an element that makes other manufacturers jealous. IBM not only has the largest sales force calling on the largest present customer base of computer users but also has the largest number of reseller outlets in the world. In addition, the excellent reputation of the company allows it the luxury of constantly selecting from the top of the pool of talented prospective employees.

Applications software has been a weakness for IBM, and the present set of products offered with the Personal Computer is no exception. One exception is the PFS series software from Software Publishing Corp. These tools, privately labeled by IBM as the Assistant series, are doing reasonably well.

Another problem IBM faces is how to move from the Personal Computer architecture to the Personal Computer AT architecture. Already there are inventory problems both at IBM and the retailers, and it appears that a fire sale could be imminent.

The trials and tribulations of the PCjr are now history but not before IBM was stripped of the demigod status. All in all, IBM is facing challenges that rival both AT&T and Apple.

Special Report

Environment software marketplace heats up

Fourteen-year-old concept catches on, provides users with easy operating environment

By Robert Lefkowits
Special to CW‡

This will be remembered as the year that the 14-year-old Xerox Corp. Palo Alto (Calif.) Research Center (Parc) user interface technology finally achieved broad market acceptance.

This technology involves the use of the following:

- Multiple application windows on a single video display.
- A mouse to move a pointer around the display.
- Menus that appear when the user needs to make a choice and that disappear as soon as the choice is made.
- Pictorial representations of objects, such as files, and actions, such as deleting a file, called icons.

This type of interface aims at providing users with a visual representation of the functions to be performed by their personal computers.

The 1983 introduction of Apple Computer, Inc.'s Lisa was the first attempt by a major hardware vendor to attract a large group of users to this new way of interacting with their personal computers. Although Lisa's high price kept it from succeeding in the marketplace, Apple followed with the Macintosh in January 1984. The Macintosh's success has drawn the attention of most major personal computer companies to this new visual interface.

Until recently, these vendors had been reluctant to look at the Xerox Parc interface technology because a number of firms, notably Xerox and Visicorp, lost substantial amounts of money attempting to market the technology to the personal computer user. The Macintosh's highly successful first year has forced major vendors to reevaluate their user-interface strategies.

IBM, Digital Research, Inc. and Microsoft Corp., along with a host of small software firms, have invested millions of dollars in developing operating environments for the IBM Personal Computer. These operating environments are based on concepts developed at Xerox's Parc facility, and each is designed to make applications easier to use. Table 1 compares the features of the operating environment products of each major competitor in the environment arena.

Topview

Topview, IBM's offering, is significant for a number of reasons. These include the operating environment's ability to run existing, unmodified applications software, its multitasking capabilities and its method of transferring data between different applications through the use of keyboard filters.

Keyboard filters allow applications to share data by making it appear to the application that the data being transferred is coming from the user's keyboard, rather than from the computer's memory. This means that data can be passed to an application without that application being reprogrammed to accept data from memory.

Topview has been criticized for its inability to handle multiple graphics applications concurrently because it is character-based. However, Topview can run a single graphics application in foreground mode. Furthermore, IBM has targeted Topview to the business user who needs to perform concurrently tasks such as data base searching, communications and word processing. To date, these users have not expressed any need to perform multiple graphics applications simultaneously.

Topview represents the first internally developed major Personal Computer software product marketed by IBM. Since IBM has not yet licensed Topview to other hardware manufacturers, those who have been marketing Personal Computer compatibles are faced with a sizable problem: How do they maintain off-the-shelf software compatibility with the IBM Personal Computer if much of the applications software will be modified to run with Topview?

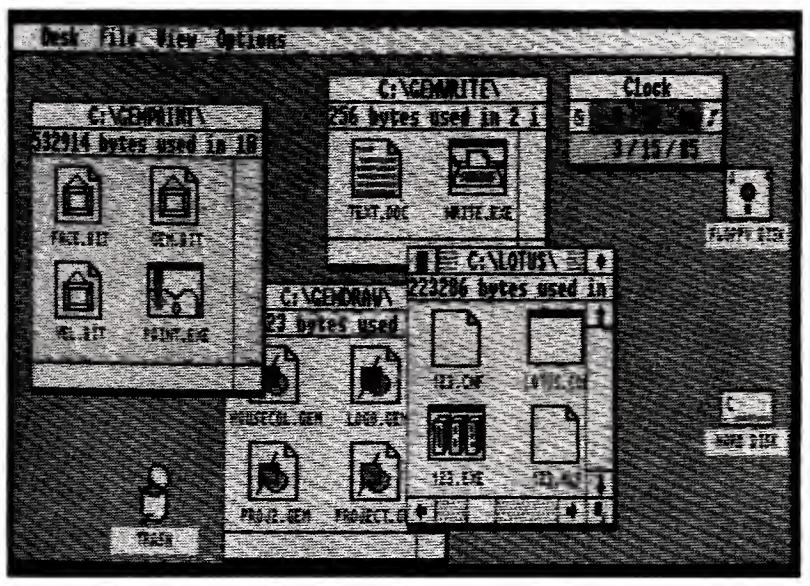
Before Topview, Personal Computer-compatible manufacturers could license Microsoft's MS-DOS operating system because PC-DOS was developed for IBM by Microsoft on a nonexclusive basis. But now, these manufacturers face a crucial decision. Do they simply maintain complete hardware and PC-DOS compatibility with IBM so that users can purchase Topview to run on their compatible machines, just as Amdahl mainframe users buy software directy from IBM?

Do they follow the risky and potentially costly course of attempting to reverse-engineer Topview themselves? Or do they concede the Topview portion of the market to IBM and attempt to look to other market segments with the help of the Graphics Environment Manager (GEM) from Digital Research, Inc. or Windows from Microsoft?

GEM and Windows

This past February, Digital Research began shipping GEM development systems to independent software vendors. GEM is designed to be as user-friendly for IBM Personal Computer users as the Xerox Parc/Macintosh-developed interface is for Macintosh users.

In fact, an early version of GEM shown at the Hannover Faire in West Germany was so successful in its attempt to make the Personal Computer look like a Macintosh that Apple was rumored to be preparing to sue Digital Research. This suit did not materialize because Apple discovered that Digital Research developed GEM entirely from scratch, using the same public domain software technology from Xerox's Parc that Apple used in its Lisa and Macintosh machines. However, Digital Research is not relying only on the Personal Computer to provide the hardware vehicle for GEM. It has signed agreements with major OEMs, such as Atari, Inc. and Commodore Business Machines, Inc. to support GEM.



Digital Research, Inc. is targeting its GEM program at both the business and home markets.

It is positioning GEM for both the business market with the Personal Computer and the home market with Atari and Commodore, in the hope that the Xerox-Macintosh interface will achieve significant market acceptance in at least one of those markets.

Meanwhile, in Bellevue, Wash., Microsoft is quietly retrenching its Windows product. Microsoft's credibility took a major beating when it announced Windows more than a year before it was ready to ship. As of March 31, Windows had not yet shipped. Although Microsoft has said it will attempt to position Windows as a "Macintosh, plus more" for the Personal Computer, Windows appears closer to Topview than to the Macintosh.

Windows uses Topview Program Information Files (PIF) to get the parameters it needs to run an application. In addition, like Topview and unlike Mac and GEM, Windows is multitasking. And whereas the Macintosh and GEM make extensive use of icons for all objects and actions within the personal computer, Windows uses icons in some cases and text in others.

If Microsoft can meet its current targeted shipment date of April, it will provide OEMs with a clear alternative to GEM and will pose a formidable competitive challenge to Digital Research.

Apple Computer

And what about Apple? How will the current attention users are giving products that make the Personal Computer look like a Macintosh affect the Macintosh's sales? At first it might seem that GEM and Windows pose a major threat to Apple. Both products allow corporate users to buy IBM hardware while retaining the advantages of the Macintosh's innovative user interface. However, the number of users ready to adopt mice with windows and icons is relatively small compared with those who prefer traditional character-based applications.

Thus, a good argument can be made that GEM and Windows will help broaden the overall market for applications that use the new visual environments by making more users aware of the advantage of this type of interface.

See **XEROX** SR/14

Lefkowits is director of software research for Infocorp, a Cupertino, Calif.-based market research and information services firm specializing in syndicated services and custom research for the information processing industry.

The new visual environments
Features comparison

	GEM Digital Research, Inc.	Macintosh Apple Computer Inc.	Topview IBM	Windows Microsoft Corp.
Windows				
Multiple Windows	Yes	Yes	Yes	Yes
Overlapping Windows	Yes	Yes	Yes	No
Pull-Down Menus	Yes	Yes	Yes	Yes
Desktop Accessories	Yes	Yes	Yes	Yes
Use of Icons	Extensive (Optional)	Extensive	None	Partial
Applications				
Multitasking	No	No	Yes	Yes
More Than One In Memory	No	No	Yes	Yes
Cut, Copy and Paste (Old Applications)	No	No	Yes	Yes
Cut, Copy and Paste (New Applications)	Yes	Yes	Yes	Yes
Use of Mouse	Optional	Required	Optional	Optional
Text Fonts				
Multiple Screen Fonts	Yes	Yes	No	Yes
Multiple Hard-Copy Fonts	Yes	Yes	No	Yes
Graphics				
Full-Screen Graphics	Yes	Yes	Yes	Yes
Graphics in a Window	Yes	Yes	No	Yes
Graphics Hard Copy	Yes	Yes	Yes	Yes
Memory Usage				
User Memory Available on 512K Machine	384K	460K	320K	356K

SOURCE: INFOCORP

Table 1

Special Report

Firms cannot afford casual attitudes toward piracy

By John J. Xenakis
Special to CW‡

Is your company in danger of being exposed to a potentially damaging lawsuit because of software piracy? If it is like most companies, the answer is yes, according to Paul S. Hoffman, a lawyer and author in Croton-on-Hudson, N.Y., who specializes in software contracts.

"The attitudes I have [seen] among data processing managers or information center managers are very casual attitudes toward [personal computer-level] software," Hoffman said. "They have an 'everyone seems to be copying, so I can turn a blind eye to it' attitude, even though they know that probably quite a few of their people are copying software at work and using it at home. That position is not acceptable. The company will end up with a great deal of exposure."

> *'[Managers] have an "everyone seems to be copying, so I can turn a blind eye to it" attitude.'*
>
> **— Paul S. Hoffman**
> **Lawyer and author**

The number of recent lawsuits attests to this. Lotus Development Corp. has won several judgments against companies which freely copied its 1-2-3 program. And the Association of Data Processing Service Organizations and Micropro International Corp. have recently filed litigation against American Brands, Inc. and Wilson Jones Co., complaining of copyright infringement.

Part of the confusion surrounding piracy comes about because the rules of the game are unclear. What is permissible varies from vendor to vendor and from software product to software product.

First of all, a software product is not actually purchased, at least not in the same way a computer is purchased. When software is purchased, a license is bought that allows the buyer to use that product in a certain way. The vendor still owns the software. The purchaser's rights to the software are limited by the license agreement and copyright laws.

Shrink-wrap license

Most microcomputer software products come with what is known as a shrink-wrap license. The packaging instructs the purchaser to read the license before opening the package and implies that the purchaser will be bound by the terms of the license agreements once the shrink-wrap seal is broken.

The restrictions imposed by these licenses vary. Some licenses restrict the use of the software product to only one machine, with as many users on that machine as needed. Others restrict the software to only one user, on several different machines if management wishes. Almost all forbid use on a multiuser machine. Some licenses forbid any copies from being made; others permit copies for backup or archival purposes only.

Are such license agreements binding on the purchaser? "There is a great deal of controversy in the industry about how enforceable these agreements are," Hoffman said. "Some states, like Louisiana, have moved toward statutes that appear to validate shrink-wrap licenses as effective contracts, provided that they offer some minimum protection to the consumer. But nobody really knows at this point how effective these shrink-wrap licenses are, and I am not aware of any litigation in the contract sense."

Even though the shrink-wrap license agreements are not valid in some states, the software still cannot be copied freely. The software is copyrighted, and purchasers are still bound by the federal copyright laws, which permit them to make a copy of the software only for backup or archival purposes.

Copy protection

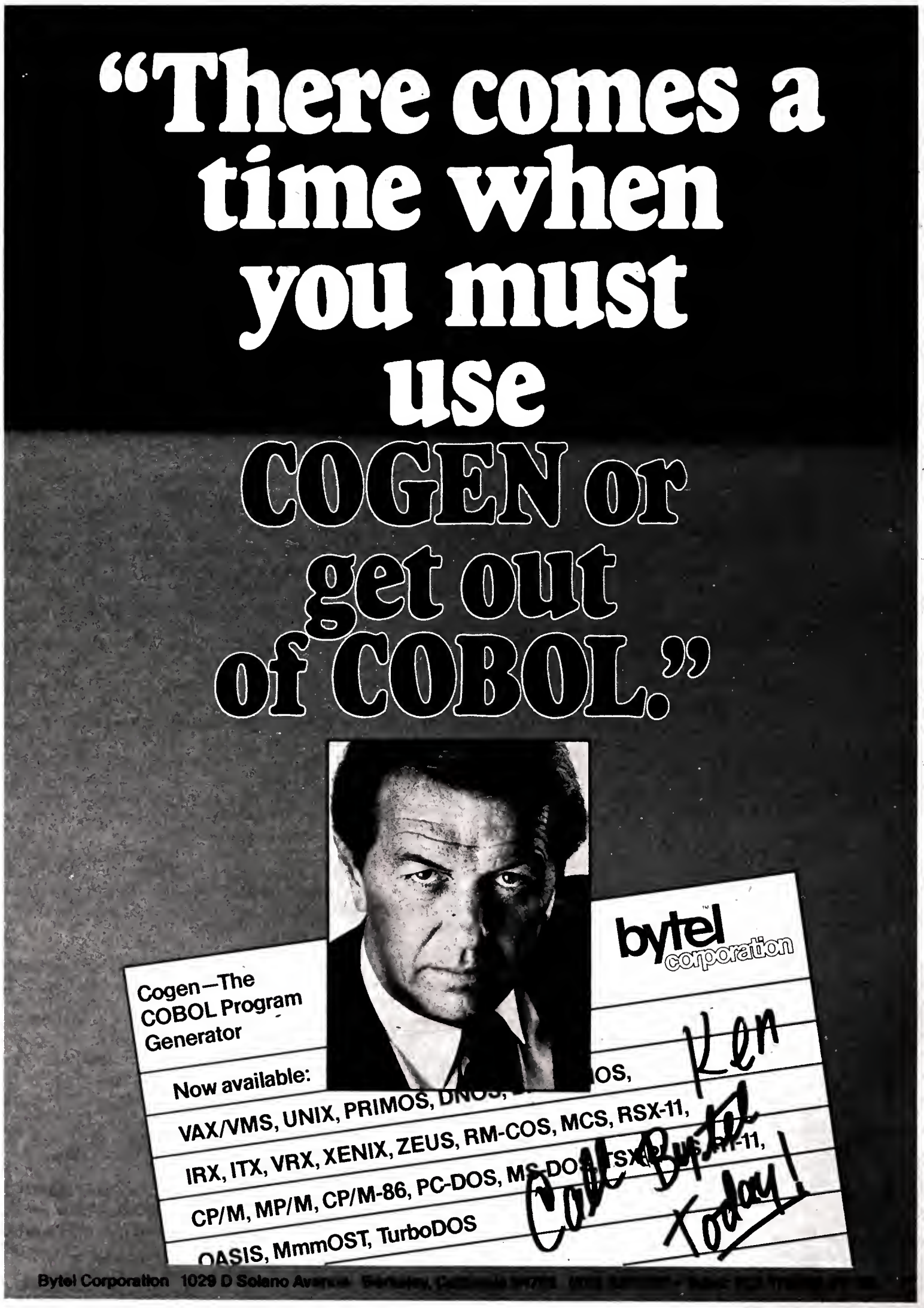
While lawyers are slugging it out in the courtrooms, an even more bizarre battle is being fought by computer engineers. This battle concerns the development of software that cannot be copied.

The original idea was simple. The vendor would put some illegal data on the software diskette so that the standard disk copying programs are not able to make copies of the diskette. That way, the vendor's software is protected from illegal use without having to depend upon legal protection.

In response, along came products called bit copiers. These products are specifically designed to defeat copy

See **COPY** SR/14

Xenakis is a Framingham, Mass.-based management consultant for the computer industry.



Special Report

Micros slash firm's telecom expenditures

Switch from dumb terminals pays off for multinational

SOUTHFIELD, Mich. — A multinational manufacturing firm based here cut its monthly telecommunications costs for international financial reporting from $25,000 to $2,000 when it began using microcomputers rather than dumb terminals to access time-sharing services.

Federal Mogul Corp. makes ball bearings, sealing devices and other parts used in the trucking, construction and aerospace industries and general industrial applications. The firm has manufacturing plants in 10 foreign countries and maintains inventories in 20 warehouses overseas. Its net sales in 1984 were $912 million; international sales accounted for $243 million of the total.

Until November 1983, employees at Federal Mogul's foreign offices keyed financial data about their operations into dumb terminals that were linked on-line to mainframes on General Electric Information Services Co.'s (Geisco) international time-sharing network.

Workers in the firm's international finance department here accessed and processed the information by dialing dumb terminals into a Geisco mainframe in Rockville, Md.

"Using dumb terminals meant that the mainframe did the actual number crunching," according to Wilhelm A. Schmelzer, Federal Mogul's director of international finance. "With each of roughly 30 international locations inputting various types of data, . . . this led to intolerable costs." The firm's headquarters was spending about $25,000 per month for line charges, CPU time and data storage.

The foreign offices were paying between $800 and $3,000 per month in line and connect charges. Employees in each office had to go on-line in order to key data into the system. "That is where the real cost came in," Schmelzer said. The costs varied according to how much time individual employees took to type in data, check their work and make corrections.

After a year's experience with the time-sharing setup, corporate management deemed the charges excessive and instructed the international finance department to cut costs. Schmelzer sent representatives to the foreign offices to check their procedures. He then analyzed the time-sharing bills to see where the firm could save money.

'We had to take other measures'

In a series of stopgap measures, his group pulled some foreign offices off the network, eliminated some types of financial reporting and cut back on the frequency of some transactions. The investigations and service cutbacks did not yield sufficient savings. "That's when we finally found that . . . we had to take other measures," Schmelzer said.

In September 1983, the department set up two trial sites for microcomputer-based time-sharing. The trial sites, Federal Mogul offices in Puerto Rico and South Africa, received IBM Personal Computers fitted with modems and financial software.

Employees in the two offices entered financial data on the Personal Computers and used the software, IMRS, Inc.'s Micro Control, to convert the figures from local currencies to U.S. dollars. After they entered, checked and corrected their work, the employees used the software's communications ability to dial in to the Geisco network and transmit their data.

The tests paid off. Because the offices entered and converted their data on the local processors and went on-line only to transmit the information, their combined line charges dropped from about $2,300 to about $600. The managers of the local offices were pleased with the results, as were members of the international finance department. According to Schmelzer, "We jumped through the roof here."

Schmelzer's group recommended to corporate management that Federal Mogul adopt the micro-based setup for all its international accounting transactions. In November 1983, the firm began to install Personal Computers and compatible machines, each running the Micro Control software, in other foreign offices and at its headquarters.

> *The cost savings from local processing have eased relations between the corporation's international finance department and its foreign office managers, who have to foot the bill for transmitting their data.*

Twenty-three Federal Mogul facilities in 18 countries currently use the system; one more is scheduled to come up soon (Figure 1).

The firm's headquarters brought its monthly time-sharing costs down to about $2,000 a month, about $1,200 of which constitutes charges for data storage. The foreign offices' average time-sharing costs have dropped to between $25 and $100 per month.

With the system, the foreign offices key in financial data on their personal computers and then go on-line to transmit the information to a mainframe on the Geisco network. Employees in the international finance department at the firm's headquarters then dial in to the time-sharing network to call up the information.

They download the data to an IBM Personal Computer XT and use the Micro Control software to compile the information into financial statements and management reports. "We still use the communications link we used prior to installing Micro Control," Schmelzer said. "It's just that every computation we need is done at the office concerned, and the link through the network's time-share is purely to transfer data."

The cost savings from local processing have eased relations between the international finance department and the foreign office managers, who have to foot the bill for transmitting their accounting data.

The managers had complained about the cost of carrying out reporting procedures with the terminals. Although they complied with corporate guidelines, they did so grudgingly, according to Schmelzer. "You can imagine the support we have now from the managers," he said.

In the foreign offices, employees use their personal computers for tasks other than transmitting financial information. Some small offices have set up inventory and receivables systems, and all the offices use Lotus Development Corp.'s 1-2-3 spreadsheet package, according to Schmelzer's assistant, Mark Gergel, Federal Mogul's international accounting manager. "We've come a long, long way in one year in automating those locations," Gergel said.

By bringing microcomputers to the foreign offices, the international reporting system provided the basis for these other uses of automation, he said. "If it weren't for the . . . reporting system, we'd be light-years behind."

The system's software has given the international finance department a variety of reporting capabilities. Schmelzer's group uses the software to compile 80 separate ledgers each month, including profit-and-loss statements and balance sheets for each foreign location.

Quick closing

With the international reporting system, the department can close its books for any given month within 11 working days of the month's end, Schmelzer said.

At the end of each month, the department transfers compiled financial data to Federal Mogul's corporate general ledger system, which runs on two IBM mainframes: a 3033 and a 3084 Model QX. A terminal emulation board on the Personal Computer XT allows for the transfer.

Gergel said one of the software's greatest benefits is that it allows the department to format reports in-house. When Federal Mogul used Geisco to process its financial data, it had to request format changes and wait for the service bureau to make them. Most requests required a turnaround time of between 10 days and three weeks.

An in-house programmer can now develop reports on the microcomputer in as little as 15 minutes, he said. With in-house development capability, Gergel said, "We're no longer reliant on anybody."

CW CHART BY MITCHELL J. HAYES

Sites on Federal Mogul Corp.'s micro-based international network

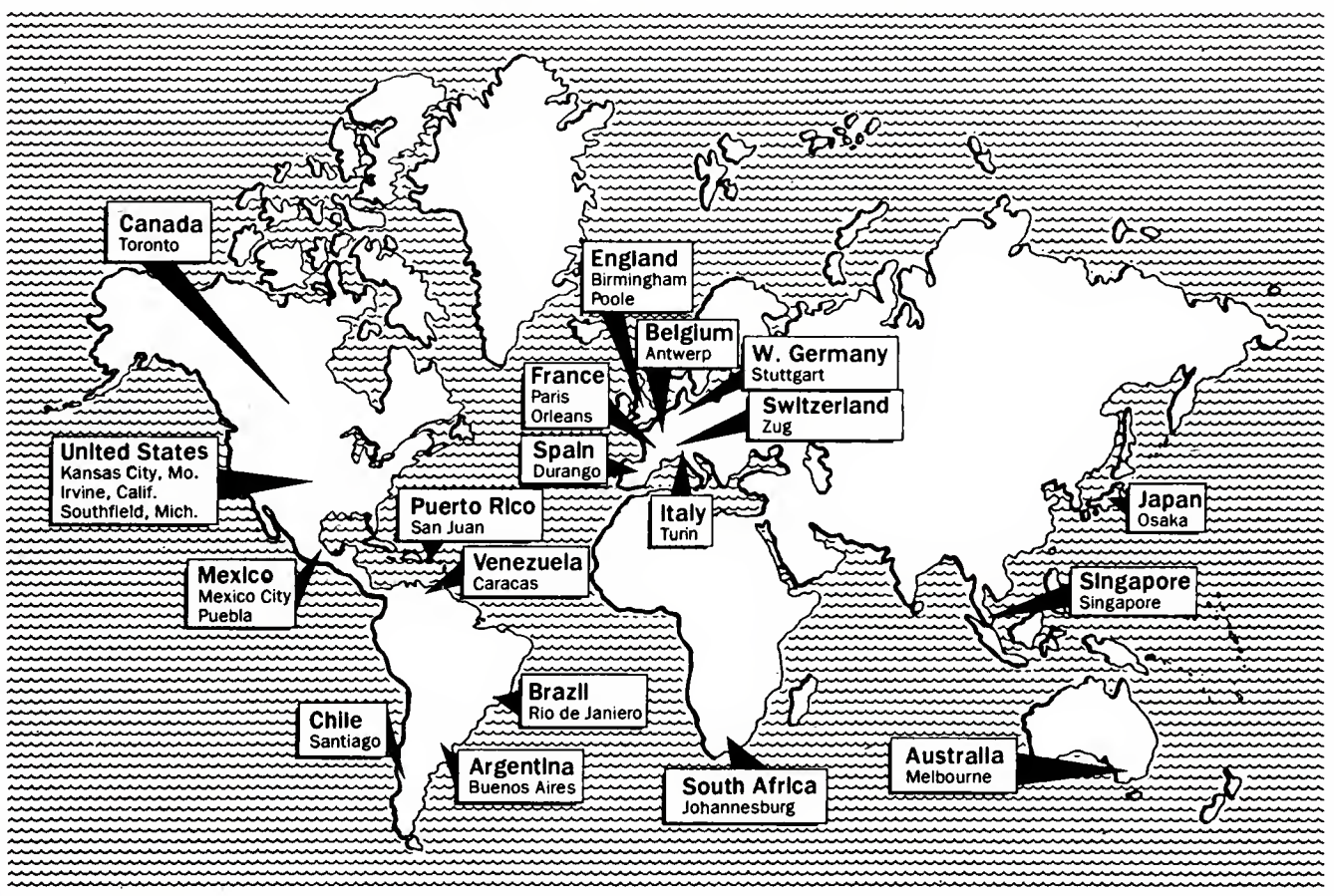


Figure 1. Micros at 23 of Federal Mogul Corp.'s locations currently have access to the firm's time-sharing network. Stuttgart, West Germany — the 24th location — is scheduled to come up soon.

Special Report

Microcomputers spur interest in telecommuting

By Gil E. Gordon
Special to CW‡

When Alexander Graham Bell invented the telephone, he probably had no idea it would lead to Dial-a-Joke, home pizza delivery and telemarketing. Those applications evolved because the telephone was available. The telephone affects many aspects of our lives and in a similar manner, the microcomputer is beginning to have the same kind of widespread, unpredictable impact on business today.

One such impact is on the location of work; the micro is one of the driving forces behind telecommuting. It is no longer necessary for all employees to work in one central location.

> *The key to successful implementation is to focus on the human resource and supervisory issues because telecommuting is rarely a technical challenge today.*

Workers can be productive in their homes and other remote locations with payoffs for employees and employer alike.

The basic idea of telecommuting is simple: Employers can allow some of the work force to spend part of the workweek at a remote site, often — but not always — linked to the office via micro or terminal over phone lines. The employer benefits through improved recruiting, a retention of key staff, improved productivity and reduced office space costs.

Employees also come out ahead with less expense and wear and tear from commuting, a more flexible work schedule and greater opportunities for those who, for many reasons, cannot come into the office five days every week. The key to successful implementation is to focus on the human resource and supervisory issues because telecommuting is rarely a technical challenge today.

There are five major reasons why the spread of micros will hasten the spread of telecommuting. Remote work may not have been what the designers of today's micros had in mind, but it is one more way to take advantage of this technology.

■ The job is in the machine. Micros are shrinking the geography of the professional's work space. As more white-collar workers begin to rely on micros as integral parts of their jobs, they rely less on the papers, files and other materials spread throughout the office.

This is not another pitch for the paperless office — paper manufacturers should not lose any sleep over the spread of micros. But the fact is that file and data base access, computing power, report and graphics generation, electronic mail, data base management and word processing can all be done in many cases with just a micro and a phone line. The micro frees the office worker from the confines of the office.

Despite the micro's progress, telecommuting's weaknesses are micro-mainframe links and telecommunications links. Those two are the glue that holds micro-based remote work together. Right now, that glue does not always stick too well. Hence, because many actual and potential telecommuting applications involve stand-alone micro work or fairly routine dial-up access with appropriate security features, these weak lines may be problematic. They are not, however, serious obstacles across the board.

■ Smaller is (getting) better. We're making headway when a micro can be carried in a briefcase instead of on a luggage cart. "Portable" is losing its status as a euphemism for "luggable" when it comes to micros. For example, the buyer's guide in the March 1985 issue of "Pico: The Briefcase Computer Report" lists 32 models, the heaviest of which weighs 14 pounds. And these are just the ones classified as briefcase models; highly portable machines like the Apple Computer, Inc. Apple IIc or the IBM PCjr are not even included.

The emergence of these smaller machines is a plus for telecommuting even though most people that work at home several days a week use micros or terminals that stay at home. The added advantage of the briefcase or laptop model is to open up remote work possibilities for people who might only want or need to be off site sporadically.

Instead of just taking home briefcases, these people will take home briefcases with micros in them. Once they see the pluses of working at home, some of them will evolve into

See **WORK** SR/34

Gordon is president of Gil Gordon Associates in Monmouth Junction, N.J., and specializes in implementation of telecommuting programs. He is also editor of the monthly newsletter "Telecommuting Review," published by Telespan Publishing.

Lotus™ on a VAX™?

dBASE II on a VAX?
Friday! on a Micro VAX?
Condor on a PDP-11?
PFS:File on a PRO?
Personal Pearl on a VAX?
QuickCode on a Micro VAX?
Spellbinder on a VAX?
WordStar on an MV/10000?
R:base 4000 on a VAX?
Multiplan on a PDP-11?
PL/M on a VAX?
SuperCalc 3 on a PRO?
T/Maker Integrated on a VAX?
MS BASIC on a Micro VAX?
Milestone on a PDP-11?
Palantir on a PDP-11?

SpellStar on a PRO?
MailMerge on a PDP-11?
PMS II on a VAX?
dBASE II on a PDP-11?
Lotus 1-2-3 on a PDP-11?
Open Access on a PRO?
MS FORTRAN on a VAX?
Condor on an MV/10000?
Multiplan on a PDP-11?
WordStar on a VAX?
SuperCalc 2 on an Eclipse?
PertMaster on a PRO?
Palantir on a VAX?
QuickCode on a PDP-11?
DISC-DBL on a VAX?
PerfectWriter on a PDP-[illegible]?

WordStar on a PDP-11?
Spellbinder on an Eclipse?
Friday! on a VAX?
PerfectWriter on a PRO?
RM/COBOL on a PDP-11?
RTCS/UDI on a VAX?
Mass-11 on a PDP-11?
Milestone on an Eclipse?
Lotus 1-2-3 on a Micro VAX?
Peachtree on a VAX?
SpellStar on a Micro VAX?
Mass-11 on a PRO?
Datebook II on a VAX?
PMS II on a PDP-11?
Final Word [illegible] MV/10000?
[illegible] a Micro VAX?

The BRIDGE People
virtual microsystems

YES! 415-841-9594

For OEM/distributor information, call 415-841-9595.

With The BRIDGE,™ you can run virtually *any* MS-DOS® or CP/M® program from *any* terminal on just about *any* minicomputer!

Benefits: The micro software users want: Instant network (with stand alone micros, too). No compatibility problems. Total control. More cost effective.

Proven in hundreds of installations. It can work for you, too. Call for more information.

Virtual Microsystems, 2150 Shattuck Avenue, Suite 300, Berkeley, CA 94704

Trademarks: The BRIDGE—Virtual Microsystems; VAX—Digital Equipment Corporation; Lotus—Lotus Development Corporation.
Registered Trademarks: MS-DOS—Microsoft Corporation; CP/M—Digital Research, Inc. Everything else is also a trademark/registered trademark of someone.

ONLY PINWRITER DOT MATRIX PRINTERS CAN SAY ALL THIS.



Pinwriter printers are available in black & white and color models.

The reason most people buy a dot matrix printer is for versatility.

And that's exactly why you should buy an NEC Pinwriter™ printer.

Pinwriters are the final word in versatility.

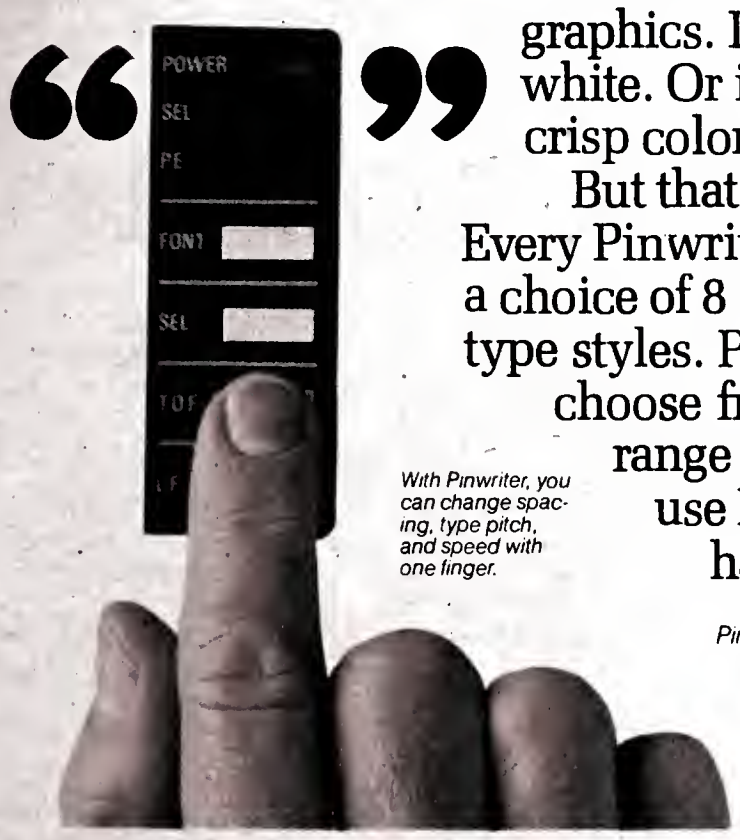
The Pinwriter lets you do more than any other dot matrix printer. Three different speeds cover all your needs—300, 900 or 1800 words per minute.

Pinwriter printers also let you create unbelievably clear graphics. In black and white. Or in seven crisp colors.

But that's not all. Every Pinwriter gives you a choice of 8 different type styles. Plus, you can choose from a wide range of easy-to-use NEC forms handlers.

"The quick brown fox
The quicker brown fox
The quickest brown fox"

Three printing speeds cover all your needs.



With Pinwriter, you can change spacing, type pitch, and speed with one finger.

And to make things even easier, Pinwriter printers work with the most popular PCs and software packages.

All the controls at your fingertips.

The Pinwriter is also much easier to use than any other dot matrix printer.

Press a button and you can change typefaces. Or speeds. Even spacing and pitch selection. And that's a refreshing change.

"I CAN PRINT PICA HIGH SPEED.
OR PICA CORRESPONDENCE QUALITY
OR PICA NEAR LETTER QUALITY
OR ELITE CORRESPONDENCE QUALITY
OR ELITE NEAR LETTER QUALITY
OR PROPORTIONALLY SPACED CORRESPONDENCE
OR PROPORTIONALLY SPACED NEAR LETTER QUALITY
OR CONDENSED
OR ANY PROGRAMMABLE TYPEFACE"

The Pinwriter prints in 8 different typefaces at the touch of a button.

Of course, you can do it through your software, too.

See your dealer for a quote.

For all this versatility, you might expect to pay a bundle for a Pinwriter printer. Not so. Pinwriter prices are also easy to handle.

For more information, call 1-800-343-4418 (in MA call 617-264-8635). And find out why more and more PC owners are saying, "NEC and me."

NEC AND ME

NEC Information Systems, Inc.
1414 Massachusetts Ave.
Department 1610
Boxborough, MA 01719



Pinwriter is a trademark of NEC Corp.

Special Report

Managers must make building communications nets

By Emily Johnston
Special to CW‡

If you think that the microcomputer is the bane of the data processing director, that its proliferation spells the end of central control of the information resource, that it is an additional burden on DP people and that it reduces the DP department's authority and importance, think again.

In reality, the microcomputer is the best asset the DP department could have.

Conjure up this scenario: In a large room filled with mainframes people are gathering papers from the printer, looking at CRTs, mounting tapes or reading the latest *Computerworld*.

They have plenty of time to evaluate and plan the installation of the latest operating system release. All of the tapes are hung in their proper slot. Vivaldi plays on the radio.

> ”
>
> *DP managers must sit down with the users and find out what their needs are.*

Hard to do, isn't it? Why, you ask, are these people not tearing their hair out trying to generate that important financial report for the president of the company? Why are there no data entry people or field engineers? Why is the console not beeping that the queues are full? Why is there no three-piece-suit-type person banging his fist on the operations manager's desk? Why is the systems programmer not paging frantically through manuals?

In the usual computing environment, the user may be sitting at his terminal tying up machine resources or patiently explaining to the applications programmer why it is imperative that his output be printed sideways on the page. Perhaps last week the user filled the job and print queues with reports that no one will ever read, and one of those jobs wiped out half the data because he entered the wrong option.

The hypothetical computer room mentioned earlier is quiet because its users are not doing these things. Instead, one user is running a spreadsheet program to generate a financial report. Another is using a word processor to write a proposal for a potential contract. Others are using micros to manage the cafeteria budget, update the spare-parts inventory or sort the customer list by geographic location. In short, the users are being productive.

Can you imagine what those applications would do to a mainframe? Forty people using an interrupt-driven word-processing package, 20 more using rapid-screen-refreshed spreadsheets, 30 people tying up the disks with data base queries, and DP personnel running a payroll for 14,000 people back in the computer room would bring a mainframe to its knees.

From an efficiency viewpoint, the mainframe environment is well rid of these smaller applications. After all, mainframe resources are really needed to do corporate payroll, general ledger, cost allocations across departments, job costing, scheduling and billing.

All these are large batch jobs, requiring input from all the corporate data bases and generating stacks of output measured in feet.

The key to success

The key to achieving the calm computer room environment depicted above is communications — hardware communications — so that users can get current information from the mainframe

Johnston is president of Carroll Computer Consultants, a Westminster, Md. consulting firm.

IT'S TIME TO STOP PUTTING BAND

Without doubt, the proliferation of personal computers throughout your organization has done much to increase personal productivity within departments.

But it has also given rise to an increasing – and alarming – decentralization of information, much of which is vital to the whole organization.

The answer, of course, is networking – tying together groups of PCs on a system that allows them to communicate with others.

Unfortunately, however, most currently available networking solutions address only part of the problem. Sure, they tie compatible PCs together within departments. But can they communicate with similar networks in other departments?

And where does that leave the information needs of the company as a whole? What about communications between non-compatible PCs, LANs, host minicomputers and mainframes?

What is really needed is a solution that addresses *all* of your networking problems. A solution like Banyan's Virtual Networking System.

Unlike LANs and other partial solutions to the problem, Banyan approaches networking from the standpoint of distributed computing, where one or more LANs must be supported within departments, between departments, between buildings or even in other cities.

Special Report

a top priority to take full advantage of micros' assets

to work with their micros and clear the lines of employee communication. If these communications networks are to work, planning is vital to their success.

It is in this stage that the DP department becomes the hub of the corporate wheel; it is the DP department that does the planning.

Since the DP staff has provided user services for a while, it's fair to assume they will understand the users' computing requirements.

Determining needs

To facilitate this, DP managers must sit down with the users and find out what their needs are and what central data they will need to do their work.

Armed with this information and its knowledge of the company and its general business plan, the DP group can apply its hardware and software expertise to the determination of systems requirements.

This is not just a matter of selecting microcomputer hardware and software — the DP staff must consider communications protocols and networks, file formats, shared data requirements and security problems.

They must consider the level of sophistication of the users and the psychological and ergonomic aspects of this endeavor. It's not going to be easy.

These plans all center around the communications network — the DP manager must decide whether the company should install a local-area network, use dial-up or dedicated telephone lines, stick with good old-fashioned cabling or implement some mix of these.

Next, the DP group has to set up access procedures, create procedure files, determine read/write authorizations and worry about communications software and data base security.

Problems solvable

A bundle of problems must be addressed, but they are able to be solved with the liberal application of knowledge, research and cooperation.

The benefit of a system such as this is that the users will manage their own department budgets and use a canned procedure to update the corporate budget with department totals.

> *The DP department will only have to concern itself with keeping the facility tuned and working properly, running payrolls and voucher checks and administering the central data bases.*

The inventory or customer list of one department can be cross-checked against such lists of others for duplications.

These lists can be merged on the central facility; the inventory value is an entry in the annual report, and every customer will get a copy.

DP concerns

The DP department will only have to concern itself with keeping the facility tuned and working properly, running payrolls and voucher checks and administering the central data bases.

In addition, the staff will update systems and get hardware fixed or replaced.

At this point, each person is doing the job he knows best and has the proper tools to do so. Each machine is devoted to the tasks it does most efficiently. Nobody is fighting over resources or priority.

The managers have up-to-date information whenever they want it; the secretaries have quadrupled their output but not their hours; the sales force has organized customer lists; and the finance office knows who owes what.

AIDS® ON NETWORKING PROBLEMS.

In effect, Banyan offers you a low-cost method of standardizing workstation communications at the department level, while allowing each department to install the LAN solution that best meets its requirements.

Banyan's total distributed systems approach allows you to use existing networking applications, to build new applications, and to integrate them into your company's total information system at any time.

It benefits users at the department level, and fits into MIS plans by providing a communications environment which is compatible with the information sharing needs of the entire company.

To find out how Banyan's Virtual Networking can free your company from the confusion of partial solutions, while creating a solid strategy for future communications, call (617) 366-6681, Ext. 23 or write Banyan Systems today.

Banyan Systems Incorporated
135 Flanders Road, Westboro, MA 01581

BANYAN

Band-Aid® is a registered trademark of Johnson & Johnson, Inc.

Special Report

XEROX from SR/7

If this market broadening occurs, Apple will benefit. While IBM captures the character-based users, and Digital Research and Microsoft battle for the graphics-based users of Personal Computers, Apple will succeed by selling to the growing number of users who want the visual interface but also want an alternative to IBM hardware.

In addition, as major independent software vendors begin shipping applications designed to take advantage of the new visual environments, the end user will become the ultimate beneficiary of the competition among the operating environment vendors.

> *Apple will succeed by selling to the growing number of users who want the visual interface but also want an alternative to IBM hardware.*

As hardware and software vendors adapt their operating environment offerings to the needs of their target markets, users will have an ever-widening variety of traditional character-oriented and new graphics-oriented applications from which to choose.

Applications aimed at the novice user will continue to become dramatically easier to use. Applications aimed at the sophisticated user will offer an increasing level of speed and power to do complex computing tasks previously performed only on mainframes.

COPY from SR/8

protection schemes, since these copiers are capable of recognizing and copying illegal data on protected diskettes.

In response, vendors have been developing increasingly sophisticated copy protection schemes, and the bit copier companies have been following with more sophisticated copier programs.

This war has escalated to ridiculous heights. One company has developed a copy protection scheme which will wipe out a system's hard disk files if it detects the use of illegally copied software. In response, a bit copier company claims to have found a way to beat that protection scheme and provide general hard-disk protection from such programs.

The most common objection to copy protection is that it inconveniences the legitimate user. Many software protection schemes require continued use of diskettes, even by a user with a hard disk, such as that on an IBM Personal Computer XT. Others require a lengthy and complex installation procedure, which novice users often find baffling.

Ironically, studies conducted by Future Research, Inc., a market research firm, indicate that copy-protected software diskettes are being copied and used illegally almost as frequently as totally unprotected ones. Users also have complained so loudly about the hassles that vendors are beginning to abandon copy protection schemes.

One of the most spectacular reversals came in January of this year when Micropro decided to remove copy protection from its Wordstar 2000 word processor product. The software had been out only a couple of weeks when user complaints about the lengthy installation period became so great that the firm announced that everyone who had bought the product would be entitled to free unprotected diskettes of the same product. This is probably the most brief copy protection policy in history.

There is a solution in sight, and it has to do with a new form of licensing now being made available to companies by some vendors. Suppose a company plans to buy 30 to 40 copies of a software product. They talk with the vendor to obtain a site license, which gives them the right to make unlimited copies of the software for use at a given site or sites. Many of these site licenses also permit an employee to make a copy to use on his own home computer for noncommercial purposes. They pay one fixed fee for this right.

Purchasers may have to do some research and negotiation to get a site licensing agreement, however.



Supports IBM's 'Virtual Diskette' — File Transfer Software. PC-XT or AT's Hard Disk!

Twinax Attach your PC to your IBM S-34/36/38 as a 5251-11 workstation!

Another first from Ampak Business Systems ...It's called **PC-MINI**®. It's an IBM PC or XT/AT product. It allows the PC to look like an IBM 5251 model 11 workstation. It consists of a card and a diskette. And unlike other emulation products, it attaches directly to your minicomputer's twinax cable!! No need for those optional communication adaptors, modems or modem eliminators in your host IBM S/3X.

Our PC-MINI is more than terminal emulation.

Our PC-MINI not only replaces IBM's 5250 emulation card at a much lower cost. Much sooner. But our enhanced version will support a PC printer, as an IBM 5225 matrix printer. If you are looking for more than terminal emulation...you are looking for our PC-MINI. It currently supports all of IBM's file transfer software written for the S/3X. And also has a 'hot key' feature that is used to switch between a PC or a S/3X session.

It's available now!

So, why wait for deliveries from the Big Blue when our exciting communication link is available now. The entire kit is for $835. From ABS, your dependable supplier of high quality, *twinax* attached *printers* for the S/3X. Give us a call right away at **(714) 731-4217.**

Or write us at Ampak Business Systems, Inc., 2640 Walnut Avenue, Tustin, CA 92680.

ABS

"Dealer Inquiries are Welcomed."
TLX: 325397 Ampak Tus

Your Twinax Connectivity Experts!

If you use DBMS,
you've seen d way.
And you've seen R way.

Now take a look
at something
completely different.

Your way.

Introducing R:base
Because your people
be using applications than

If you're like most M.I.S. directors, you're under pressure to be more productive than ever before.

And now, there's a new DBMS product that can take this heat off your department.

It's the all-new R:base™ 5000.

5000. would rather waiting for them.

It doesn't matter if it's being used by your top programmer, a rookie sales manager, or anybody else in the company. With new R:base 5000, anyone can develop custom, heavyweight applications—and save hours, even days of development time.

The secret of new R:base 5000? A unique menu-driven Application Express™ feature that actually generates programming code. While guiding your users through the entire development process. So, instead of entering thousands of keystrokes, or writing lines of code, they just answer a series of simple questions. Then, the Application Express does the rest. To speed things up even more, it includes instant forms and reports, too.

New R:base 5000 also features a fast new way for your staff to set up their databases: visually. They simply fill in the blanks in an on-screen table. And if they want to build menus into an application, they just tell the Application Express what to do, and it writes the code automatically.

For the novice users in your company, new R:base 5000 is a way to write complex applications right off the bat. And it gives veteran programmers the heavyweight procedural language they need to build sophisticated applications and systems—with or without the Application Express. Either way, they'll save time and increase their productivity. Because R:base 5000 also gives them fast and easy data verification, data entry, and report generation.

PRODUCTIVITY:
R:base 5000 vs. dBASE III

CLIENT DATABASE MENU

1. Add a client master list.
2. Change a client master record.
3. Delete a client master record.
4. Print client report.
5. Exit.

Using dBASE III™ and R:base 5000, we built this menu and linked it to its subroutines. The resulting applications were equivalent. The effort required wasn't.

	R:base 5000	dBASE III
Automated steps	37	0
Command lines	47	244
Keystrokes	434	6588
Time*.	9 minutes	2 hours

*Actual time may vary depending upon skill level.

So why not give the whole company a big boost? And give yourself a break at the same time?

Check out the all-new R:base 5000.

And see what it's like to have everything running your way.

R:BASE 5000
FROM MICRORIM®

Your way. That's R way.™

Introducing R:base
Because it takes a real
to go the distance

5000. heavyweight with you.

Most people think dBASE III™ is the heaviest, most powerful DBMS you can get your hands on.

But wait till you see the new R:base™ 5000.

It's got more of the heavyweight programming power it takes to develop powerful DBMS applications. Starting with a comprehensive procedural language that's faster and easier to use. With functions dBASE III doesn't even offer. Like a data dictionary. User-definable rules. And password security.

What's more, new R:base 5000 also features more structural modification capability than ever. With commands that can expand, change, and remove columns and tables in a database. Instantly.

With dBASE III, the report generator is extremely rigid. But new R:base 5000 makes things a lot more flexible. With up to 9 different levels of subtotals. Access to system date and time. And multi-table report generation.

And the heavyweight story doesn't end there. New R:base 5000 even comes with a set of predefined macros, for faster, cleaner application development. These macros can also be customized to fit any application.

So if you need a DBMS that can take on the heaviest jobs of all, you need the all-new R:base 5000.

It's never been easier to go the distance.

HEAVYWEIGHT FEATURES

	R:BASE 5000	dBASE III
Comprehensive Procedural Language:	Yes	Yes
Application Compiler[1]:	Yes	No
Report Writing Features: (A) Access to System Date and Time:	Yes	No
(B) Choice of Column or Row Format:	Yes	No
(C) Accessible Tables:	40	10
Password Security:	Yes	No
User-Definable Data Entry Rules:	Yes	No
Automatic Key Index Maintenance:	Yes	No
Data Dictionary:	Yes	No
Number of Relational Operators:	6	2

[1]From original manufacturer.

R:BASE 5000
FROM MICRORIM®

Your way. That's R way.™



See what it's like to have things your way. 1-800-547-4000.

If you'd like to get a look at the new R:base™ 5000, just give us a call at the above number (ask for Dept. 954). From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 954. For only $9.95 (plus shipping), we'll send you an interactive tutorial. Not a canned demo, but a "mini-version" of the product that actually lets you build applications.

Give us a call and we'll send your tutorial right out. But if you want to see R:base 5000 today, head for a leading computer store or software dealer.

And discover the DBMS that lets you deal with information the way you're accustomed to.

Your way.

R:BASE 5000
FROM MICRORIM®

Your way. That's R way.™

Special Report

Sporting goods chain scores with in-house budget tools

CARTERET, N.J. — A sporting goods retailer here hiked the efficiency of its budgeting procedures when it switched from an outside time-sharing service to an in-house system based on a general ledger software package and a micro-mainframe link.

Until recently, Herman's World of Sporting Goods, a retailer that operates more than 115 stores, relied on the time-sharing system for all of its modeling procedures and financial analyses. The firm had a homegrown general ledger system that ran in house on a 16M-byte IBM 4381, but the system did not support any budgeting capabilities. When Herman's needed a budget, it sent a tape with its financial data to the time-sharing service bureau for processing.

The cost of the service was prohibitive, turnaround time was slow, and the process was inefficient, according to Debbie Krochalis, Herman's manager of financial systems.

"When we were on time-sharing, actuals had to be loaded into the data base, resulting in duplication of data in the in-house and time-sharing systems," she said. "Additionally, the in-house general ledger didn't have access to the budget data developed on time-sharing."

In April 1983, Herman's began looking for a new general ledger system. Krochalis said the firm had the following two primary goals for the software:

- To replace the outmoded homegrown general ledger — a batch processing system — with software that provided on-line capabilities, a variety of report writers and other sophisticated features.
- To phase out reliance on the time-sharing service by providing budgeting capabilities.

Link support affects choice

Support for micro-mainframe data transfer also weighed as a factor in Herman's choice of general ledger systems, Krochalis said. "It was certainly something I was looking for."

After a five-month search, the firm purchased McCormack & Dodge Corp.'s GL:Millennium general ledger package, which offered support for PC Link, the vendor's micro-mainframe link.

Herman's installed the general ledger software in January 1984 and brought it into full production four months later. Last September, the firm installed PC Link on an IBM Personal Computer in the finance department.

That month, analysts in the department began using the link to prepare Herman's budget for 1985, which was due in early December. They downloaded actual financial data from the general ledger system to the Personal Computer, performed budget analyses with Lotus Development Corp.'s 1-2-3 and uploaded budget data into the general ledger.

Krochalis explained that the procedure was more efficient than the one the company followed with the time-sharing service and that it saved her analysts time.

Herman's maintains PC Link on one Personal Computer, which is hard-wired to the mainframe and fitted with a Digital Communications Associates, Inc. Irma board. During the 1985 budget analyses, workers in the finance department made duplicates of the disk on which PC Link had captured financial data from the mainframe. They then massaged the copied data on stand-alone Personal Computers with 1-2-3.

Herman's world of sporting goods

The time savings this procedure allowed came from two sources, according to Krochalis. First, because analysts were familiar with Lotus, they could proceed without much instruction. Second, the disk copies allowed a number of people to prepare budgets simultaneously.

BASF QUALIMETRIC™ FLEXYDISKS®.
A GUARANTEED LIFETIME OF
OUTSTANDING PERFORMANCE.

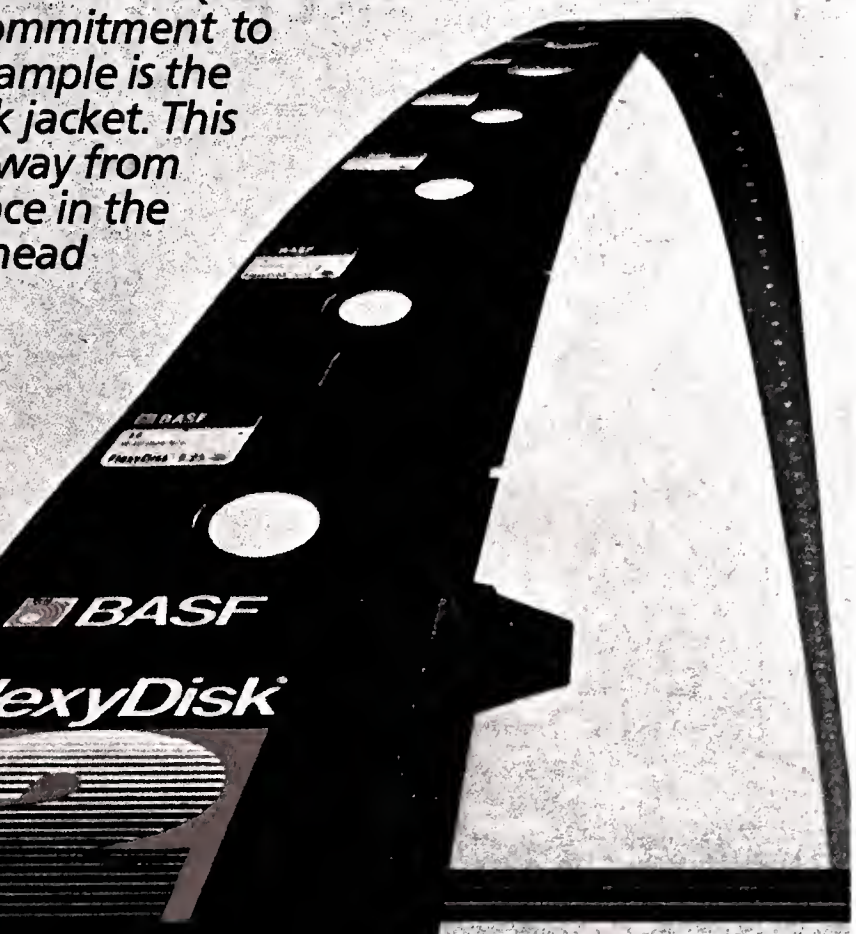
BASF Qualimetric FlexyDisks feature a unique lifetime warranty, firm assurance that the vital information you enter on BASF FlexyDisks today will be secure and unchanged tomorrow. Key to this extraordinary warranted performance is the BASF Qualimetric standard... a totally new set of criteria against which all other magnetic media will be judged.*

You can count on BASF FlexyDisks because the Qualimetric standard reflects a continuing BASF commitment to perfection in magnetic media. One example is the unique two-piece liner in our FlexyDisk jacket. This BASF feature traps damaging debris away from the disk's surface and creates extra space in the head access area for optimum media-head alignment. The result is a guaranteed lifetime of outstanding performance.

For information security that bridges the gap between today and tomorrow, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

Visit BASF at Comdex/Spring, Booth 650

*Contact BASF for warranty details.



ENTER TOMORROW ON BASF TODAY.

1983 BASF Systems Corp., Bedford, MA

BASF

Special Report

Terminal emulators conquer space shuttle supplier's

TARRYTOWN, N.Y. — For a firm here that supplies parts for the National Aeronautics and Space Administration's space shuttle and other aircraft, giving microcomputer users access to mainframe data was a matter of finding the right stuff: specifically, the right medium for data extraction and file transfer.

Simmonds Precision, a subsidiary of Hercules, Inc., manufactures fuel gauges, ignition systems and other devices for commercial and military aircraft. A year and a half ago, the firm looked for a way to download operations-related data from mainframes to microcomputers to distribute computing tasks.

According to Dave Fredenburg, manager of product assurance data systems for Simmonds' Instrument Systems Division: "We wanted to federate some of the mainframe processing power."

That task centered on finding a common medium with which to transfer data. "You don't have 5-in. diskettes on a mainframe; on [personal computers] you don't have tape drives," Fredenburg said. "You have to have some [common] medium."

In September 1983, Simmonds purchased a number of terminal emulation boards that allowed coaxial wire to serve as that medium. The emulators, Irma boards from Digital Communications Associates, Inc., allow microcomputers that are hard wired to communications controllers to appear to Simmonds' 8M-byte IBM 4341 mainframe as 3270-type terminals.

Extract data from mainframe

In terminal-emulation mode, the microcomputers can extract data from the mainframe and use it for local processing tasks. Users whose micros are fitted with the boards can also send files to the mainframe, where other users can access them.

About 25 of Simmonds' 60 IBM Personal Computers, Personal Computer XTs and Compaq Computer Corp. micros are fitted with the emulation boards. Simmonds uses Pansophic Systems, Inc.'s Easytrieve software for data extraction and Panlink for file transfer.

Employees in the firm's headquarters here and at its Instruments Systems Division in Vergennes, Vt., use the extraction and transfer capabilities to help them perform a number of different tasks as follows:

■ Financial analysts at Simmonds' headquarters use their micros in terminal-emulation mode to pull cost data from the mainframe. They then switch back to a local processing mode and use Lotus Development Corp.'s 1-2-3 to massage the data and determine pricing strategies.

■ Parts inspectors in Vergennes use their machines as personal computers for voice entry during inspections; they call out the results of

June report to focus on DBMS

The increased use of multiple data bases and moves by vendors toward integrating applications more tightly around a central data base management system are two of the factors that give DP managers something to think about whenever they consider the DBMS issue.

The June *Computerworld* Special Report will focus both on the technical aspects of DBMS and on the continuing evolution that is taking place in the marketplace for that technology.

The report will also cover issues that relate to purchasing and maintaining the corporate data base.

It will include, for example, articles on how to evaluate and select a DBMS and discussions on how MIS manager can maintain the security of a multiuser data base.

Different types of data base design and their effects on a firm's daily operations will also be examined.

Contributions to the Special Report are welcome. They should follow one of two formats:

■ A tutorial article, discussing an issue or trend.

■ An application story, outlining a particular user firm's experience with a DBMS.

Articles must be typed, double-spaced and range in length from four to six pages. Artwork that explains or expands upon an author's topic, such as charts, graphs and photographs, is welcome.

Authors should include both a brief biography and a telephone number at which they can be reached.

The deadline for submissions to the Special Report on DBMS is May 5.

If you have a DBMS story that you would like to tell or any questions to ask, send them to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

All in all, WordPerfect is absolutely stunning.

PC Magazine

In the beginning, the creators of WordPerfect set out to design the perfect word processing software for business. Along the way, they tested each new function on the very secretaries who would eventually be using it. Thanks to them, the product lives up to its name: WordPerfect.

Easy.

Learning WordPerfect's basic text editing functions is quick and simple. Plus, comprehensive documentation and simple practice exercises help even beginners master WordPerfect's many other functions easily.

PC World

Fast.

With WordPerfect's document orientation, you never have to wait between pages of text. No matter how fast you type, WordPerfect won't slow you down.

WordPerfect makes putting together a professional-looking balance sheet or financial report easy.

BYTE

Complete.

In addition to standard word processing functions, WordPerfect includes many extra business features, such as a 100,000-word phonetic dictionary; table and index generation; multi-page footnoting; automatic outlining and paragraph numbering; and a network version. Get the business word processor that's living up to its name. WordPerfect.

WordPerfect is a word processor for business applications.

For more information, see your dealer. Or call or write:

SSI Software
288 West Center Street
Orem, Utah 84057
Information: (801) 224-4000
Order Desk: 1-800-321-4566, Toll-free



SSI Software
Reaching for perfection.

Special Report

data transfer, processing limitations

their inspections, and the machines record the information. The inspectors also use their machines as terminals to query mainframe data bases for scheduling information.

■ Clerical workers in the Instrument Systems Division in Vergennes use their personal computers as terminals for data entry to mainframe data bases and as local processors for data entry to personal computer data bases. They also retrieve mainframe files and massage them with microcomputer word processing software.

■ Software developers in the Instrument Systems Division use their machines both as micros for microcomputer software development and as 3270-type terminals for mainframe software development.

Fredenburg said that in all these applications, the firm benefits by off-loading processing from the mainframe, by getting dual use out of its microcomputers and by eliminating the need to rekey data.

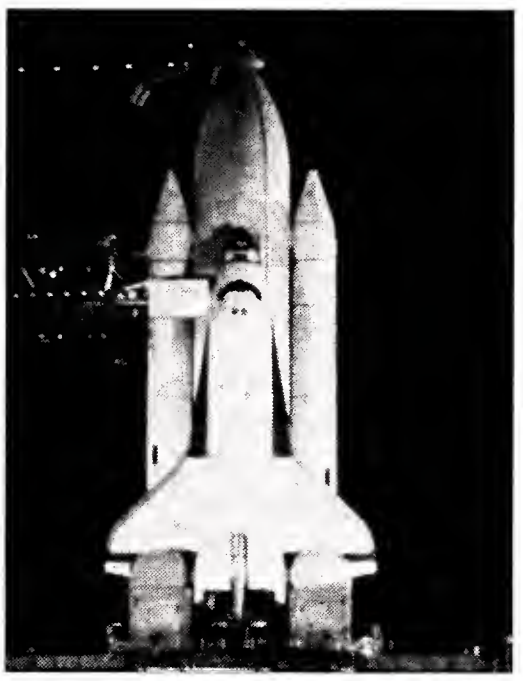
Saves money every day

By off-loading processing tasks, such as software development, to the micros, the firm saves money every day in CPU time and channel costs, Fredenburg said. Simmonds also saves in the long run because it can distribute its processing load and therefore eliminate the need for frequent mainframe upgrades, he said.

By giving users both terminal and personal computer capabilities at the same workstation, the firm gets a logistical benefit. "You don't have to have two machines there to get the job done," Fredenburg explained.

By eliminating the need to key data into microcomputers, Simmonds has prevented unnecessary labor. But more important, Fredenburg said, the firm has been able to implement applications, such as the generation of reports from mainframe parts lists, that it could not set up without the ability to download data for local processing.

"There is really no way to take a file that has 300,000 characters in it and key it into a [personal computer]," he explained.



Simmonds is a supplier of parts for Nasa's space shuttle.

MIS managers must go with micro network flow

Influx of personal computers presents opportunity to enhance corporate role

By James Y. Bryce
Special to CW‡

What was once a slow and almost silent push for communications among micros has suddenly gained momentum. The local-area network has brought the desire for communications to the forefront of the industry.

The MIS professional who attempts to stem the influx of micros and networks is doomed to failure. This resistance, based on the fear of losing power or position, does not address the inevitable change that microcomputer networks portend:

Distributed processing will put substantial power in the hands of users.

Those professionals who view the shift as an opportunity for cooperation and growth, will find their positions substantially improved, albeit different. MIS managers who are willing to change with the new technology will prosper.

The technology of micro-mainframe connection consists of a number of facets, including the following:

- Physical connections.
- Software.
- Security.
- Auditing.
- Data integrity.

MIS managers who want to improve their positions and change with the new technology must consider each of these.

Physical connections. As a beginning, the manager must find some way to connect the micro to the host computer. The first connections to become available, and the ones most frequently used, allow the micro to emulate a terminal and otherwise ignore the power resident at the user's desk. Communications are transmitted from the terminal to the host, which frees the user from the need to have both a terminal and a micro on his desk.

Organizations pay a substantial price for this freedom. The cost of many of the hardware and software packages involved in emulation is a considerable percentage of the cost of a standard terminal, yet the performance of the micro/terminal is much slower than that of a standard tube. From the user's point of view, this disadvantage is compounded by the gymnastics that are required to make the micro keyboard work the way a terminal keyboard does.

Early micro-mainframe communications links relied on existing systems for terminal connection to the host. More current schemes feature channel attachment of local-area networks to the host. These attachments offer wider possibilities to the network manager, including the cabability for peer-to-peer communications among all computers on the network.

Software. Gradually, vendors are developing products that serve to heighten the utility of the connection beyond that of simple terminal emulation.

Several programs on the market permit disks or printers to capture a screen load of information. Other programs allow users to transfer entire files to disk with a few key strokes. More exciting programs emphasize the dominance of either the micro or the mainframe.

Among micro-oriented software offerings, the most exciting for many users is the virtual diskette server. The virtual server, portions of which run on both the mainframe and the micro, turns the mainframe into a giant file server for the microcomputer.

Micro users see the mainframe as an almost limitless collection of disk drives and floppies they can access. More sophisticated versions of these programs allow other mainframe programs to insert and extract data from the virtual diskettes.

This insertion and extraction process is a gray area between the micro and the mainframe orientations. Cooperative processing between the microcomputer and the mainframe, carefully governed by the mainframe, allows micros to extract information contained in complex mainframe data bases.

Currently, programs that offer these capabilities are the top of the heap in micro-mainframe links; as such, vendors demand top dollar for them.

Security. The emergence of links that go beyond simple terminal emulation leads to the need for security measures beyond those available for terminal environments. Security can be obtained at the level of the host, the communications system, the micro and the user.

At each level above user level, the MIS manager can institute passwords, access permits and hidden files to block unauthorized activities.

At the micro level, physical security devices like key locks may be effective. Many networks allow for the use of micros without disk drives and thereby prevent the unauthorized acquisition of entire disks worth of data.

At the user level, the MIS manager can maintain profiles that keep track of the kinds of access an employee typically uses and flag any authorized but unusual access attempts. To provide additional security, managers can require employees to use physical identifications, such as magnetic strip badges, to log on to a micro.

Data encryption also offers substantial protection, but the time necessary for encryption and decryption may offset any gain.

Auditing. When every micro in an organization has access to the corporate data base, the potential for the creation of new ideas is great. Unfortunately, the potential for total confusion is equally as great.

Downloading an original data base, or a portion of the original data base, into a micro produces two copies of the same information, assuming no errors occur during the downloading. The micro user works with his copy, using a spreadsheet or some other projection software, and prints out his results.

Printouts from the micro look just as good to management as those produced by the mainframe, but the data may not be as accurate. Should management then depend on micro analyses of the mainframe data base?

The possibilities for errors in communications or calculations are too great to allow such dependence. But the speed, flexibility and creativity of micros linked to the mainframe data base are vital to the strength of the company. The solution, or at least a partial solution, is to require that an audit trail be produced.

With an audit trail, management can examine the results of micro operations, keeping watch for the limitations imposed by the source and the communications involved.

The only data base an organization should consider accurate is the one that resides on the mainframe. This data base is routinely updated and backed up. Data that is downloaded to microcomputers is synchronized only at the time of the downloading.

Data integrity. Micro-mainframe communications creates a new role for the MIS professional, that of distributed data base administrator. As part of this role, the MIS manager must devise a way to allow users to upload data.

Data that micro users supply to mainframe data bases can serve as a valuable corporate resource. This data, however, is subject to substantial corruption.

At the least, MIS staff members must check data for transmission errors to make sure that the data the mainframe receives is consistent with the data the micro sent. One way of doing this is to isolate data and compare it line by line, using encoding algorithms to detect possible errors.

Final responsibility must rest with the MIS manager, who will provide controls and review users' requests to upload data.

Bryce is president of Netserv, Inc. in Austin, Texas, a consulting, training and service firm specializing in local-area networks.

Special Report

Micro, mainframe software maintenance issues similar

By Girish Parikh
Special to CW‡

Software maintenance can be defined as corrective, adaptive or perfective labor performed on either custom-designed or packaged software. In the microcomputer software world, software support, such as answering user questions on program functions and documentation, is also included under the umbrella of software maintenance.

Maintaining microcomputer software that was developed in-house can be similar to maintaining mainframe software that was custom developed. Programs and systems developed in-house may suffer from inadequate documentation, lack of modifiability or poor logic and design.

Often at considerable expense, DP managers learned these mainframe software maintenance lessons:

- One way to reduce maintenance problems during software development is to implement better analysis, design, technical reviews and walkthroughs.
- Well-maintained and current documentation is a necessity.
- Selecting and using software maintenance tools, like documentation, is important.
- Programmers and technicians should be educated and trained in software maintenance.
- It is important to find and keep competent maintenance programmers.

If these solutions are not heeded in the development of homegrown microcomputer software, support and maintenance for the software will be very difficult.

One way organizations can support microcomputer software is to form an information center. The information center's technical staff can help users develop and maintain homegrown software. A support group in the information center can develop and provide user training and also work with the vendors of software packages on the upkeep of off-the-shelf software.

While the use of mainframe software packages is growing, comparatively inexpensive software packages are the life of most microcomputer systems.

User support is major issue

Supporting users of popular microcomputer packages is a major issue in microcomputer software support and maintenance. Corporate users may be located at geographically diverse locations.

One maintenance problem unique to packaged software is that of promptly distributing any changes or enhanced versions of software with updated documentation.

In addition to support received from the information center, vendors also can provide users with, to a certain extent, maintenance support. Some of the innovative solutions being used by vendors include electronic bulletin boards and phone support on a pay-as-you-go basis.

Other vendor maintenance options are available. A recent *Infoworld* reported that Solvation, Inc., located in Southboro, Mass., is currently developing an IBM Personal Computer program called The Buddy System, "which allows technicians to provide on-line support without leaving their offices."

Special interest groups (SIG) to support and educate users are also started by microcomputer software vendors such as Borland International and Lotus Development Corp. on Compuserve, Inc.'s Compuserve, the Columbus, Ohio-based network.

Another interesting software maintenance issue is the role microcomputers are playing in mainframe software maintenance. With the micro-mainframe links, micros have already entered the mainframe world. In the future, this link with the mainframes is likely to strengthen. Micros may also be used as stand-alone machines to support mainframe software maintenance. The following are some possible microcomputer applications in this area:

- Moving mainframe applications to micros.
- Managing mainframe software maintenance with the help of micros.
- Estimating time for maintenance work using a microcomputer software package for the estimation.
- Measuring maintenance programming productivity and maintaining productivity data bases.
- Expert software maintenance systems on micros and expert systems for forecasting programmer turnover based on behavior patterns of employees.
- Employee turnover contingency planning system.
- Downloading Cobol programs from mainframe to micro, performing modifications on the micro and uploading to the mainframe.
- Restructuring Cobol (and other language) programs on micros.
- Dedicated micros for documentation.
- Using micros for education and training in software maintenance.

Parikh is a Chicago-based consultant, lecturer and writer. His books include Techniques of Program and System Maintenance *and* Tutorial on Software Maintenance, *with Nicholas Zvegintzov.*

When the U.S. Navy demanded Total Performance, Zenith delivered.



ZENITH data systems

©1985, Zenith Data Systems

When Total Performance is the only option.

Make Stat Magic

Now for the IBM PC/AT* with hard disk

Statistics, reports and plots happen magically with SPSS/PC˜—*the* Statistical Package for IBM PC/XTs.*

SPSS/PC is the most comprehensive statistical package for performing simple or complex tasks, regardless of data size. It maintains feature and language compatibility with mainframe SPSS, while optimizing for the PC environment.

Statistics range from simple descriptive to complex multivariate, including Multiple Regression, ANOVA, Factor and Cluster analysis. Loglinear and nonparametric procedures are also included.

Simple facilities allow transfer of files between SPSS/PC and programs like Lotus 1-2-3, dBase II and SAS. A complete Report Writer. Plotting facilities and a Communications program for mainframes round out a fully integrated product.

For more information, contact our Marketing Department without further ado. And see what a little stat magic can do for you.

SPSS Inc., 444 N. Michigan Avenue, Chicago, IL 60611, 312/329-3500.

In Europe: SPSS Benelux B.V., P.O. Box 115, 4200 AC Gorinchem, The Netherlands, Phone: +31183036711 TWX: 21019.

VISA, MasterCard and American Express accepted.



SPSS inc. PRODUCTIVITY RAISED TO THE HIGHEST POWER™

*SPSS/PC runs on the IBM PC/XT or AT with 320K memory and a hard disk. An 8087 co-processor is recommended. Contact SPSS Inc. for other compatible computers.

IBM PC/XT and AT are trademarks of International Business Machines Corporation. dBase II is a trademark of Ashton-Tate. 1-2-3 is a trademark of Lotus Development Corporation. SAS is a registered trademark of SAS Institute, Inc. SPSS and SPSS/PC are trademarks of SPSS Inc. for its proprietary computer software. © Copyright 1985, SPSS Inc.

Special Report

Portables let auditors bring the office to their work

HOUSTON — Auditors at a Big Eight accounting firm's office here take portable personal computers with them when they visit the offices of client companies to examine corporate finances.

The Houston office of Price Waterhouse & Co. maintains a pool of about 50 Compaq Computer Corp. portable microcomputers for its auditors, who spend about 75% of their time working on location. According to Ed Powell, managing partner at Price Waterhouse, "Portable personal computers are a vital productivity tool."

Price Waterhouse has stored proprietary auditing software, as well as Lotus Development Corp.'s 1-2-3 and Visicorp's Visi Word, on the portables' hard disks so that auditors can carry with them the tools they need to perform their work.

Auditors take up residence in clients' offices for anywhere from two weeks to three months while they examine a client's business transactions. They check accounts receivable, for example, by asking the client's customers to verify that they have been billed for the amounts the client recorded. The auditors also count inventories, do check reconciliations with the client's bank and delve into other facets of the client's operations in the same manner.

In the end, Powell said, their analyses attest that the financial statements the client releases to its shareholders are accurate. The software embedded on the portable micros' hard disks helps the auditors choose statistical samples of transactions to examine, test their samples, extrapolate them to the whole, consolidate their findings and format final reports. "It's a great time saver," Powell said.

Proprietary software — the Audit Practice Support System developed by Price Waterhouse for its users — does most of the work and takes up about 6M bytes of the Compaq portables' 10M-byte hard disks, leaving the remaining memory for processing tasks.

The firm chose Compaq portables because they had the hard-disk capacity to support the proprietary software, yet were small enough to move from site to site, Powell said. "They're full-blown, full-powered [personal computers] that can be used . . . in our clients' offices."

He said the ability to carry micros to clients' offices benefits the firm in the following ways:

Productivity. Microcomputers increase auditors' productivity by automating work that they once did by hand. Powell said Price Waterhouse had not calculated exact time savings, but he offered this application as an example. When Powell visited a client's office after hours recently, he saw a Compaq running unattended. A Price Waterhouse auditor working at the site explained that the machine had been programmed to run a series of calculations — a job that required about two hours of processing time — and print out the results overnight so they would be available the next morning. Without the computer, Powell said, all that would be done manually.

Convenience. Portables enable auditors to perform operations wherever they are working. Before the Houston office began using portables two years ago, its auditors had to tap into Price Waterhouse's corporate mainframes, an IBM 4341 and a Digital Equipment Corp. 2060, at the firm's national administrative office in Tampa, Fla., which required that they leave client offices where they were stationed and return to the home office.

Powell said auditors still need to access the mainframes for some complex operations but added that Price Waterhouse is working to make its portables self sufficient by outfitting them with all the programs auditors need. "More and more," he said, "those are going on the hard disk."

If an auditor working out of a client office needs access to the corporate mainframes, he can use a modem and phone lines for dial-up access.

Availability. Many of Price Waterhouse's clients are just beginning to consider office automation and have yet to install micros, Powell said. Clients who have personal computers do not want to lend them to auditors. "They're very stingy," he said, explaining that most firms that have micros use them continuously and cannot give up processing power.

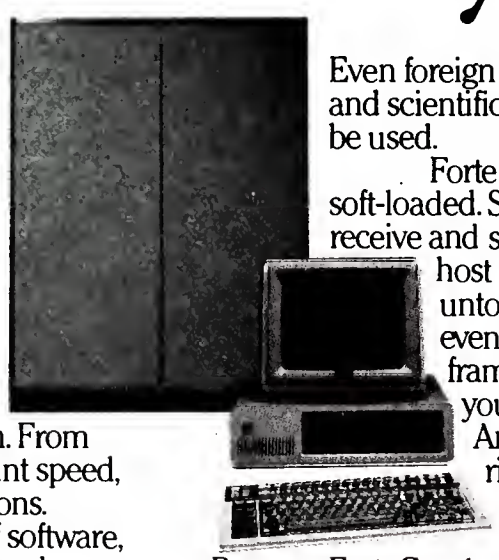
In addition, he said, auditors do not have the time to load Price Waterhouse's proprietary software onto the hard disk of a client's personal computer and erase the programs from the computer's memory after they complete an audit. The software comprises about 15 floppy disks worth of programs and takes about two hours to load onto a hard disk.

Collectively, the benefits have allowed Price Waterhouse to stay competitive with other Big Eight accounting firms, which, Powell said, are "heavily into micros because they're not stupid."

The firm maintains 15 Compaq portables for employees who calculate tax returns for clients, but these personnel use the portables less frequently than the auditors do, Powell said.



Forte puts mainframe graphics on your PC



Get mainframe graphics right at your desk. With the ForteGraph™ Emulator.

Just add it to the Forte PJ™ communications adaptor. Without using an extra slot. You're ready to roll with a single PC keystroke.

With a compatible monitor, you'll get true 3279 model S3G emulation. From color quality and screen print speed, right down to pixel resolutions.

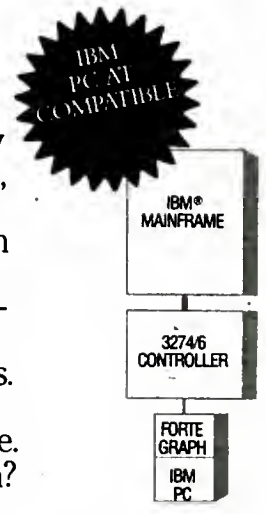
Dip into a palette of software, like GDDM[1], SAS/GRAPH® and ISSCO's TELLAGRAF.™ Create pie and bar charts, histograms and conceptual drawings. Or paint up a storm with your own custom-designed characters.

Even foreign language fonts and scientific notations can be used.

ForteGraph is entirely soft-loaded. So you can send, receive and store files while host sessions remain untouched. You can even save your mainframe graphics on your own diskettes. And print copies right in your office.

Installation? It's a snap. Because ForteGraph requires no host hardware or software modifications.

Graphic smarts from Forte. Colorful. Creative. And ready for you now. (Also available for IRMA™)



THE FORCE IN MICRO TO MAINFRAME COMMUNICATIONS

FORTE DATA SYSTEMS

2205 Fortune Drive, San Jose, CA 95131 (408) 945-9111 Telex 275973 **TOLL-FREE HOTLINE (800) 233-3278**

©1984 Forte Data Systems. [1]GDDM is a product of International Business Machines. SAS/GRAPH is a registered trademark of SAS Institute, Inc. TELLAGRAF is a trademark of Integrated Software Systems Corporation. IBM is a registered trademark of International Business Machines. IRMA is a trademark of Digital Communications Associates, Inc.

Special Report

Savings and loan industry reveals DP requirements

Nationwide survey shows preferences for hardware, software, user training

By Kenneth Grunzweig
Special to CW‡

A nationwide survey of savings institutions revealed that this industry overwelmingly favors the IBM Personal Computer and Lotus Development Corp.'s 1-2-3, purchases 40% of their hardware and software through computer stores and seeks external training programs for user education.

The savings institution industry, which is composed of more than 4,000 savings and loan associations and mutual savings banks, has evolved to meet the home financing and savings needs of households. Historically, these needs were met in a regulated and protected arena.

Today, however, complex variable-rate financial instruments have replaced their fixed-rate counterparts and, due to financial industry deregulation, savings institutions have many new competitors. On the other hand, savings institutions are no longer limited simply to providing mortgages and passbook savings accounts; they are now active competitors for checking account and credit card services.

Savings institutions have had to respond to this competitive and complex business environment with more effective information systems. How the personal computer is being used to meet the institutions' information needs was the focus of an industry-wide survey conducted by Intek Management Corp., a financial industries marketing research firm.

Intek mailed questionnaires to senior executives of more than 4,000 institutions. The 434 respondents ranged in size from less than $25 million to greater than $1 billion in total assets. All states, with the exception of Maine, were represented.

Survey results

How many personal computers are in use or planned?

More than 80% of the savings institutions surveyed had at least one personal computer. Nearly 50% had two or more, and more than 60% of the respondents planned to add additional personal computers during the next 12 months (Figure 1).

Which personal computers are being used by savings institutions?

Seventy-four percent of the survey respondents reported that they use IBM and IBM-compatible personal computers.

Apple Computer, Inc.'s Apple computer was the next most popular personal computer among the respondents and was used by 31% of the institutions. Figure 2 identifies which computers are currently installed. Since these institutions typically had more than one system, responses exceed 100%.

What software packages are they currently using?

The spreadsheet application was the most common use for the personal computer. Lotus' 1-2-3 was selected by 46.5% of the sample; Software Arts, Inc. Visicalc was a distant second, with approximately 21% of the institutions using it. Not only is 1-2-3 the leading spreadsheet package, but it was also the most popular data base management and graphics applications package.

Are there formal policies for the selection of hardware and software?

Most institutions lacked formal policies for selecting hardware and software, and they had not established corporate standards. Only about 20% of the end users consulted with the computer staff before purchasing hardware or software. The majority of purchases (40%) were made through retail computer stores. It appears that the retail computer store was instrumental in the hardware and software selection process.

Are there purchasing standards for microcomputer hardware?

Remarkably few of the savings institutions (37%) had corporatewide standards for microcomputer hardware purchases. Of those institutions that had standardized their personal computer hardware, the Personal Computer was the system of choice for 28.2%.

What software standards have they adopted?

Given its popularity within this industry, 1-2-3 was, not surprisingly, the spreadsheet standard selected by approximately 48% of the respondents. Micropro International Corp.'s Wordstar was the choice as the word processing standard for 32% of the respondents, and Ashton-Tate's Dbase II was selected as the data base management standard by 25% of the respondents.

How extensively is the personal computer used for communications?

The savings institutions have been slow to use the communications capabilities of the personal computer. Only 18% of the installations surveyed used their in-house mainframe or minicomputer systems for communications. Even though communications is becoming an important feature of the personal computer, the industry does not plan to become involved in this area.

The smaller and mid-size savings institutions rely upon service bureaus for their processing requirements. This may explain why so few plan to communicate with in-house systems. Figure 3 illustrates the current and planned communications capabilities.

Which external information services are utilized?

The savings institution industry has been slow to use outside data base services. Currently, 17% subscribe to information services. The most popular are Telerate (7.1%), Dow Jones News Retrieval (3.5%) and Interline (2.3%).

What are the applications personal computers are used for?

Spreadsheet applications, such as budgeting and financial forecasting, asset/liability management and investment analysis, were among the most popular ones.

These financial applications are indicative of why 1-2-3 and the Personal Computer are so popular within the savings institution industry. Forty-six percent of the sample group used the personal computer for word processing applications; savings institutions are replacing the dedicated word processors with personal computers whenever practical. Figure 4 describes which applications are being automated by the personal computer.

What are the training methods used and preferred?

Most general office and professional staff at savings institutions rely upon self-training, but few prefer this method of learning. Most users prefer either a formal internal or external training program to assist them in learning to use their automated systems.

It is interesting to note that external training programs were preferred by the majority of professional staff members above all other methods.

The above selections were a sampling of key results from the survey tabulations that were thought to be of special interest to *Computerworld* readers.

A complimentary copy of the complete survey results may be requested from Intek, which is located at Suite 101, 1950 Addison St., Berkeley, Calif. 94704.

Grunzweig is the president and founder of Intek Management Corp., which provides market studies and strategic plans for the financial and investment services industries and computer software and services firms.

Personal computer communications capability

Personal Computer Communications With	None	Currently Exists	Planned In 1984	Planned In 1985
In-house Mainframe/Mini	62.6%	18.0%	8.3%	11.1%
External Time-sharing and Remote Computing (Modem)	66.1%	24.0%	5.3%	4.6%
Other Personal Computers via Local-Area Network	78.9%	7.8%	7.8%	5.5%

Figure 3. Survey results showed that micro-mainframe communications are not a priority for most survey respondents.

CW CHARTS

Personal computer applications
Current and planned

	Current %	Planned %
Budget and Financial Forecasting	50.5	27.6
Asset/Liability Analysis	36.2	38.2
Investment Analysis	27.0	35.3
Graphics	24.7	22.1
Word Processing	46.5	24.4
Data Base Management	24.0	20.0
Loan Pricing Models	11.8	24.0

Figure 4. Budgeting and financial forecasting spreadsheets are the most popular applications. The current percentage column depicts the number of survey respondents using each application; the planned percentage column describes those respondents planning to add these applications.

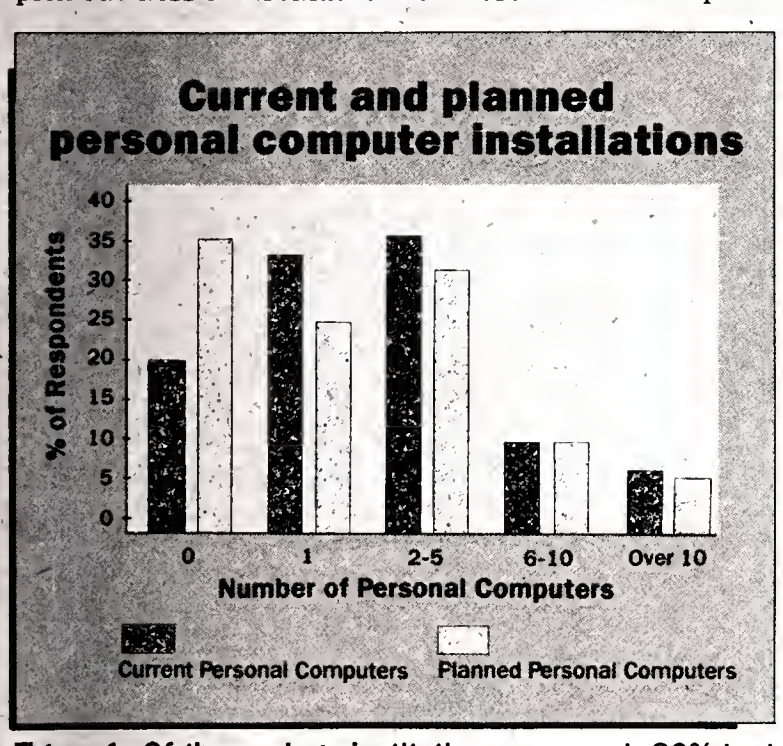


Figure 1. Of the savings institutions surveyed, 80% had at least one micro and 60% planned to add more micros.

Personal computer brands used

Personal Computer	% Response
IBM	60.1
Apple Computer, Inc.	31.1
IBM-compatible	14.3
Tandy Corp.	10.5
Burroughs Corp.	6.9
Wang Laboratories, Inc.	3.9
NCR Corp.	3.0
Digital Equipment Corp.	2.8
Televideo Systems, Inc.	2.2
Hewlett-Packard Co.	1.9
Kaypro Corp.	1.1
Other	5.8

Figure 2. IBM Personal Computers are the most used micro in this market.

Special Report

Increased personal computer use demands new breed of manager

By Constance Knapp
Special to CW‡

As microcomputers continue to infiltrate the corporate ranks, many large companies are scurrying to find a way to manage the acquisition and use of these machines. In many cases, a management position has been created — that of the microcomputer manager.

Today, there is an increasing interest in this new MIS position. Who are the micro managers? What do they do? And what corporations are using them? After all, barely two years ago, the position did not exist.

What does the micro manager do? This question would be answered differently by nearly every company. For example, at Time, Inc., personal computers are controlled and supported by the information systems development area. This includes training, technical assistance and so forth. Even supplies are "purchased" at the computer store — a Time department.

At *The New York Times*, personal computers are controlled by users, with MIS setting standards and receiving information. Each department has its own micro maven, who, although not called a micro manager, manages all the personal computers for the department. This job includes selecting software, training employees and requesting equipment. Actual ordering and purchasing are done by MIS.

The Equitable Life Assurance Society has moved toward decentralization of all its functions, and micros are no exception. Each subsidiary and operating group has its own micro manager who is truly independent. Some areas use IBM machines only; some use Wang Laboratories, Inc. equipment; and others mix and match as they see fit. All decisions are made at the operating level.

A micro manager at equitable must be fully conversant in all aspects of this new technology. Some departments even publish newsletters to share their hard-won education with others.

As the need varies, so does the position. One microcomputer manager may be familiar with all aspects of this technology, while a coordinating micro manager may use administrative skills, rather than technical skills, to manage this computing revolution.

The future

What does the future hold for these jobs? The mere fact that the title "micro manager" has been created implies definition and, to some extent, standardization, as companies begin to actively fill these positions. Some standards will be set, along with expectations of minimum levels of knowledge.

As the personal computer revolution is controlled, some fallout may occur. Companies will reign in personal computer use, as redundant equipment is identified and eliminated. Too much money is being spent, and the results are too visible for this type of user computing to continue unchecked.

In smaller companies, the micro manager may be absorbed by the systems department. In larger companies, the position may evolve, as has that of the business analyst, as a shared function, requiring people who are well grounded in both systems skills and business knowledge.

As personal computers are taken more seriously by the data processing profession, the micro manager will be considered a professional — the job will be defined, and the wide discrepancies between the job title at different companies will be narrowed.

Knapp is a New York-based computer consultant, specializing in the selection and installation of financial software.

Birth of the micro manager

Accounting and financial departments were among the first to see the value of microcomputers. At first, these machines were being used as glorified calculators, hidden away in corners. Because controllers and treasurers had the greatest immediate needs and were experts at justifying these expenses and because, in some companies, the data processing function was also handled by the controller, these were the logical laboratories for microcomputers.

After all, it is no accident that spreadsheet applications such as Microsoft Corp.'s Multiplan, Lotus Development Corp.'s 1-2-3 and Software Arts, Inc.'s Visicalc have been so successful. These best-sellers fill a strong need.

For example, in the late 1970s *The New York Times* budget department purchased an IBM 5100 (later upgraded to a 5110) to expedite the budgeting cycle. The entire budget system was written in APL. That machine has since been replaced by an IBM Personal Computer. The micro system allowed multiple passes during budget development, which was unheard of prior to its installation.

As the successful uses of microcomputers multiplied, users no longer wanted to hide their micros or to bury these expenses in office equipment or other tame budget codes.

By the early 1980s, people like the treasurer of *The Houston Chronicle* were proudly displaying their Apple Computer, Inc,. IBM and Tandy Corp. TRS-80 machines. Forecasting, trend analysis, graphs and spreadsheets came out of closets and cubbyholes, as users proudly demonstrated their newly developed skills.

As the money being spent on these machines and software grew, the need to control and centralize their use increased. By now, the micro revolution could not be controlled by traditional data processing management. A microcomputer manager was needed.

The Claremont Graduate School

Degree programs in
Information Science

Master of Science
The Management of Information Systems

Master of Science
Computer Information Systems

Doctor of Philosophy
The Management of Information Systems

"The purpose of the programs is not to produce pure computer scientists or pura managers, but rather, people who can live in the practical world."

Paul Gray
Professor and Chairman
Information Science
The Claremont Graduate School

Designed for both full-time and employed students who seek careers in the development and management of computer information systems in organizations

Applications for Fall, 1985 admission are now being accepted.
Please direct inquiries to:

Programs in Information Science
The Claremont Graduate School
Claremont, CA 91711
Phone: (714) 621-8209

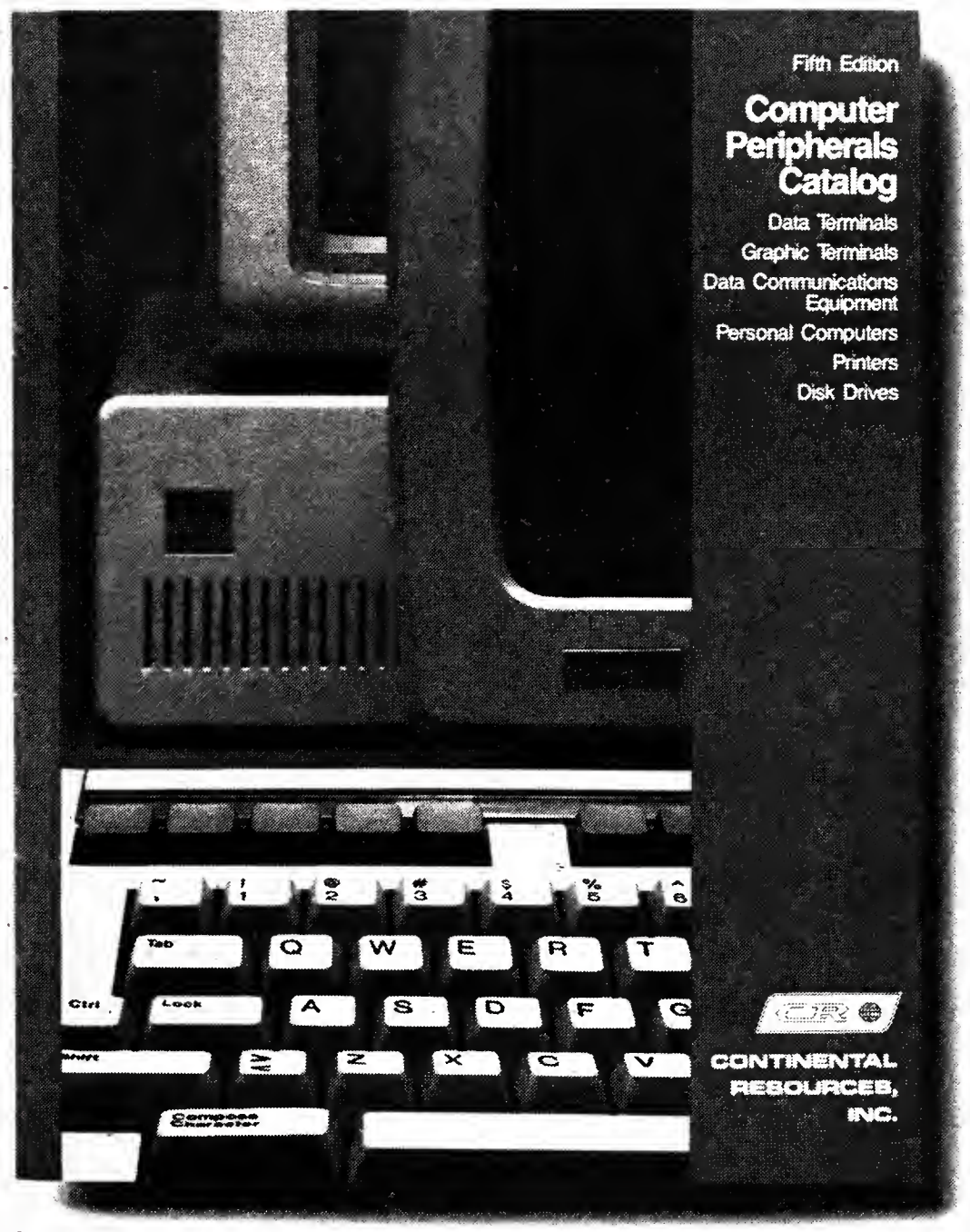


HARDWARE SELECTION MADE SIMPLE

As your business grows, so do your computing needs. It's that simple. But selecting the right equipment can be a complex task. We know it doesn't have to be. ***We're Continental Resources,*** a national marketer of high-tech products for nearly 25 years.

With us, computer equipment selection has never been easier. It's as simple as that. For a free copy of our latest Computer Peripherals Catalog or specific product information, call 617-275-0850 or our office nearest you. Continental Resources is an **Authorized Distributor** for these leading manufacturers:

AT&T
Anderson Jacobson
Beehive
Bytcom
CIE Terminals/C.ITOH
Computer Devices
Control Data Corp.
Data General
Dataproducts
Diablo
Digital Engineering
Digital Equipment Corp.
Emulex
Epson
General Datacomm
Genicom
GraphOn
Hayes
Hewlett-Packard
IBM
IOMEGA
Lear Siegler
Micom
Microcom
NEC
Northern Telecom
Selanar
Ven-tel
Visual Technology
Ziyad



Whether you're adding a new system or expanding an existing one, we can help. ***We have it all*** — terminals, personal computers, printers, disk drives, data communications devices, and much more! Choose from the industry's best . . . state-of-the art products from over 30 leading manufacturers. And, to help you get up and running, we can also outfit you with a complete line of supplies and software.

But that's not all. With Continental Resources' total support package, you're assured of the most comprehensive assistance before ***and*** after your purchase. And, if you're not ready to buy, you can take advantage of our flexible rental and leasing options.

A leader in high-tech products for nearly 25 years . . . **We deliver what you need.**

CONTINENTAL RESOURCES, INC.

Corporate Headquarters
175 Middlesex Turnpike
Bedford, MA 01730

Boston Area
(617) 275-0850

Chicago Area
(312) 860-5991

New York, NY
(212) 695-3206

Baltimore — Washington, DC
(301) 948-4310

Northern NJ Area
(201) 654-6900

San Francisco Area
(408) 727-9870
(415) 441-0189

Philadelphia Area
(609) 234-5100

Los Angeles Area
(213) 638-0454

Dallas Area
(214) 458-7616

Special Report

Project software lets firm keep abreast of DP overhaul

WOODLAND HILLS, Calif. — A microcomputer project management software package is helping the MIS department of a manufacturing firm here manage budgets, meet deadlines and apprise top management of progress during an ambitious DP overhaul.

The MIS department of Dataproducts Corp., a manufacturer of computer printers that logs more than $400 million in annual sales, began to restructure its worldwide information services function two years ago. Dataproducts operates five data centers in the U.S. and one each in Hong Kong, Ireland, England, Paris and Puerto Rico. The restructuring included projects to do the following:

- Standardize the firm's financial and manufacturing software systems.
- Standardize hardware and software and establish an international network to connect the system.
- Create corporate data bases.
- Establish an information center to encourage end-user computing.

"All this was — and still is — a tall order," according to William D. Strowbridge, the firm's vice-president of MIS. "It cried out for an efficient, coherent project management system to give us the planning and control support we needed." The firm's 50-member systems development and support staff handles up to 350 concurrent projects for 35 user departments.

Dataproducts had used a mainframe project management system to keep track of MIS work, but it did not fit the bill. The system was oriented to large projects, which consumed only one-quarter of the MIS staff's time, and required detail that was inappropriate for smaller jobs (Figure 1). Project leaders resisted, and the system fell into disuse.

Strowbridge and his staff set out to find a better system. Besides meeting general criteria, such as cost-effectiveness and ease of use, the system had to do the following:

- Allow for automated scheduling.
- Provide comprehensive project reports and management reports.
- Support cost accounting and user department charge-backs for MIS services.

Strowbridge said he and his staff considered both micro and mainframe software systems. "The problem we kept running into," he said, "was that the mainframe programs were too complicated to use handily, and the micro systems didn't have the functions we needed."

They eventually decided to purchase POC-IT Management Services, Inc.'s Microman, a micro software package designed for MIS project management. Dataproducts has installed copies of the software on two IBM Personal Computer XTs and plans to install a copy at each data center in June. Strowbridge said some features that attracted him to the package were its systems development methodology and its management reporting capabilities.

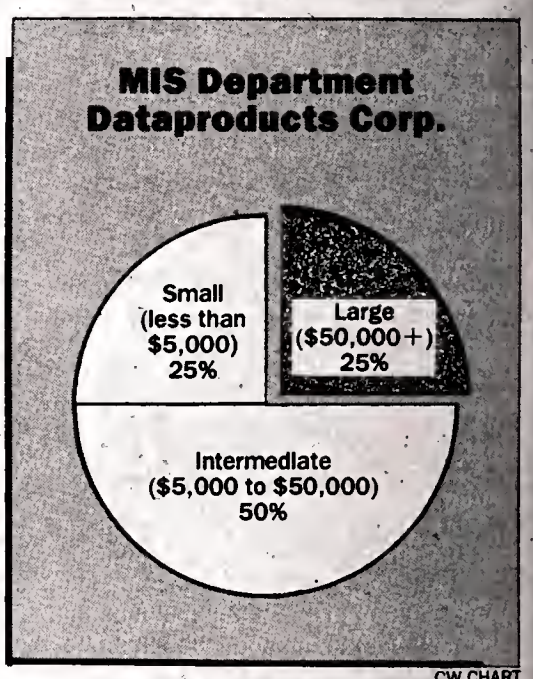


Figure 1. Dataproducts Corp. categorizes its projects as small, intermediate and large, according to budget. Its mainframe project management system was geared toward large projects, which account for only 25% of the MIS department's work.

Systems development methodology. Microman supports Dataproduct's development methodology, which includes only four project categories: life cycles, phases, tasks and subtasks. As such, Strowbridge said, it is not "a bureaucratic system that overcontrols the project" as Pert charts and other systems do.

Based on this setup, Dataproducts requires its systems development managers to design each of their projects as a series of discrete tasks and subtasks — jobs that require at least one week's work but not more than two week's worth and produce only one deliverable. When a task is complete, the manager receives credit for it on the system.

Strowbridge said that because the methodology is simple, it allows for flexibility. "My managers only manage a task," he explained, and they have freedom to design those tasks any way they want.

Management reports. Measurements of the MIS department's productivity are based on an achieved

See **OVERHAUL** SR/57

Realia COBOL. Migration without migraines.

Until recently, you had to abandon the business computer language when you developed microcomputer application software. The available micro COBOLs were inadequate—too limited, too slow. The best alternative—the XT/370 or AT/370 using IBM's COBOL—was very expensive and still too slow. To get acceptable performance, you had to retrain your programmers in Pascal or C.

Realia COBOL is the cure for such headaches.

Realia's compiler supports most IBM VS/COBOL and VS/COBOL II features, such as:

- COMP and COMP-3 data
- SELECT assignment names
- Multiple entry points
- GOBACK, EJECT, and SKIP statements
- Structured programming extensions of VS/COBOL II

You can download mainframe systems for development, maintenance, and testing. Productivity will soar.

You can compile faster with Realia COBOL than in most mainframe environments, even on floppy-based systems. Compile-time options allow cross-reference, brief and full code listings, and helpful features like subscript and decimal value checks.

Our interactive debugger lets you follow the program source, display and modify data, and set breakpoints using the normal optimized machine code.

The results are startling.

Our users report that their systems run up to 20 times faster when compiled by Realia COBOL. That's compared to our nearest micro competitor. The ratio is up to 100 times faster when compared to any of the others.

On the IBM PC AT, your programs can run at 370/148 to 370/158 speed. Realia's file system really makes your machine deliver, giving it a distinct edge over Pascal or C. Our indexed file system even has full key compression and buffer controls just like VSAM. The generated code is pure MS-DOS, so it can be run on most of the 8088/8086 machine family.

And you can sell your programs without paying us a royalty fee.

Realia COBOL is priced at $995, including one year of maintenance and upgrades. Subsequent maintenance and upgrade contracts are currently priced at $125/year/copy. Available for the IBM PC, PC XT, 3270 PC, PC AT, PC-compatibles, and the TANDY 2000.

Realia COBOL. What a relief.

IBM, IBM PC, PC XT, 3270 PC, XT/370, PC AT, and AT/370 are registered trademarks of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft Corporation.

Professional Software for the Personal Computer

REALIA inc.
10 South Riverside Plaza
Chicago, Illinois 60606
(312) 346-0642

Special Report

Division of labor gives MIS quick turnaround time

By Becky Batcha
CW Staff

Dataproducts Corp.'s MIS department consists of two separate systems groups, each of which takes responsibility for defined categories of tasks.

The firm's systems development group handles all intermediate and large projects, and its product support group takes care of small development jobs and resolves any day-to-day problems that arise.

William D. Strowbridge, Dataproducts' vice-president of MIS, said the division of responsibility rests on the idea that a man cannot serve two masters.

He said that pulling MIS staff members from a large project so that they may handle a small program fix throws the large project off schedule. Similarly, devoting an entire staff's time to a large project means that problem resolution gets ignored, and users must wait months for quick fixes.

Turnaround time

During a three-year stint as a consultant, Strowbridge found substantial proof for this claim. He discovered that, in 90% of his cases, MIS departments needed about 90 days to turn around user requests for projects that, on average, required 12 man-hours of work.

"Nobody is going to wait 90 days to get 12 hours of work out of anyone," he said. So he set up Dataproducts' MIS department to avoid the frustration that users experience when they have to wait so long.

The firm's systems development and product support groups answer to different types of budget, manpower and project life-cycle restrictions (see chart), and employees in the two groups differ in their qualifications and motivations.

Strowbridge said employees in the systems development group range from entry-level programmers to high-level managers; they plan and execute long-term projects a piece at a time.

The 'green berets'

Employees in the product support group are of a different breed. They are highly skilled systems professionals who have few management aspirations but thrive on marshaling their accumulated knowledge to solve whatever problems occur. "That's a dedicated resource of 'green berets,'" Strowbridge said, "and I don't use them for any other reason."

With the breakdown in responsibilities, the MIS department has managed to meet a strict set of goals for turnaround time:

- The systems development group arranges project budgets and completion dates with user departments. Project managers are required to stay within 5% of their budgets; they have consistently met their deadlines.
- The product support group operates with the goal to turn around all problem resolutions within 24 hours; it has done so 90% of the time.
- Product support staff members also aim to turn around requests for minor development projects within 21 days and to expend between 12 and 14 man-hours on these tasks. They have met these goals 90% of the time.

The MIS department arrangement has effectively reversed the situation Strowbridge saw when he consulted other firms on their operations.

"Ninety percent of the time, [when] the user uses the department," Strowbridge said, "instead of being frustrated, he's satisfied."

MIS development and support organizations
Dataproducts Corp.

	Systems Development	Product Support
Project Scope	Large and intermediate projects with budgets from $5,000 up	Small development projects, with budgets under $5,000, and all problem resolutions
Budget	Variable; requires cost justification for each project	Fixed annual budget based on historical needs
Manpower	80% in-house staff; 20% contract workers	100% in-house staff
Employee's Professional Qualifications	Range from entry-level to management	All experienced professionals with hands-on knowledge of many different systems
Goals and Restrictions	No project that varies from its budget by more than 5% at any point during its life cycle may continue without being reapproved by a steering committee.	• Minor development projects must be turned around in 21 days. Each averages 12 to 14 man-hours of work. • Problem resolution gets done within 24 hours.

CW CHART

WHY BUY A DATABASE SYSTEM?



TO BUILD APPLICATIONS!

PROGRESS™ is the high-performance database system and fourth-generation application development language for multi-user microcomputers.

PROGRESS gives you all the flexibility and control of structured programming languages, but uses plain English syntax for simplicity and ease of customization. You and your staff will learn to use PROGRESS quickly and benefit immediately from its state-of-the-art features.

Why build business applications in C, BASIC, or COBOL when PROGRESS will increase your productivity 10 to 40 times? PROGRESS makes this possible by integrating these powerful features:

- English-like application language
- Flexible relational DBMS
- Integrated data dictionary
- Automatic screen and report formatter
- Full-screen syntax-checking editor with on-line help

Once your application is built, PROGRESS offers:

- High performance
- Comprehensive multi-user capabilities
- Automatic database recovery
- Easy modification and customization
- Ad hoc query and report-writing capability
- Portability to a wide range of machines

PROGRESS is available today on major UNIX™-based super-microcomputers.

Power. Performance. Ease of Use . . . Now, that's PROGRESS! You can't afford to build applications without it.

DATA LANGUAGE CORPORATION
5 Andover Road, Billerica, Ma. 01821
617-663-5000

PROGRESS
A NEW APPLICATION ENVIRONMENT

Want to make PROGRESS in a hurry?
Call Area Code 617-663-5000 today.
Or just fill out and return the coupon below.

DATA LANGUAGE CORPORATION
5 Andover Road, Billerica, MA 01821
(617) 663-5000

☐ Yes! Please send me a demonstration disk and documentation for PROGRESS. I enclose $295.
☐ Please send more information about PROGRESS.
☐ I am interested in PROGRESS seminars.
☐ I am interested in becoming a PROGRESS dealer.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone (_____) _____

CWAP

PROGRESS is a trademark of Data Language Corporation, developers of advanced software technology for business and industry.
UNIX is a trademark of AT&T Bell Laboratories.



Performance. Reliability. Growth.

Standard features on every Perkin-Elmer computer.

Why are more and more businesses across the country—and around the world—choosing Perkin-Elmer for their high performance computing needs?

For the unique 32-bit architecture of our superminicomputers, and the outstanding processing performance it affords.

For our range of quality-made, ultra-reliable hardware that's been proven time and again in the toughest commercial, military and scientific applications.

And for the flexible growth, the add-on processing capabilities of multi-processors, our commitment to industry standards, compatible software and the most extensive communications capabilities available today.

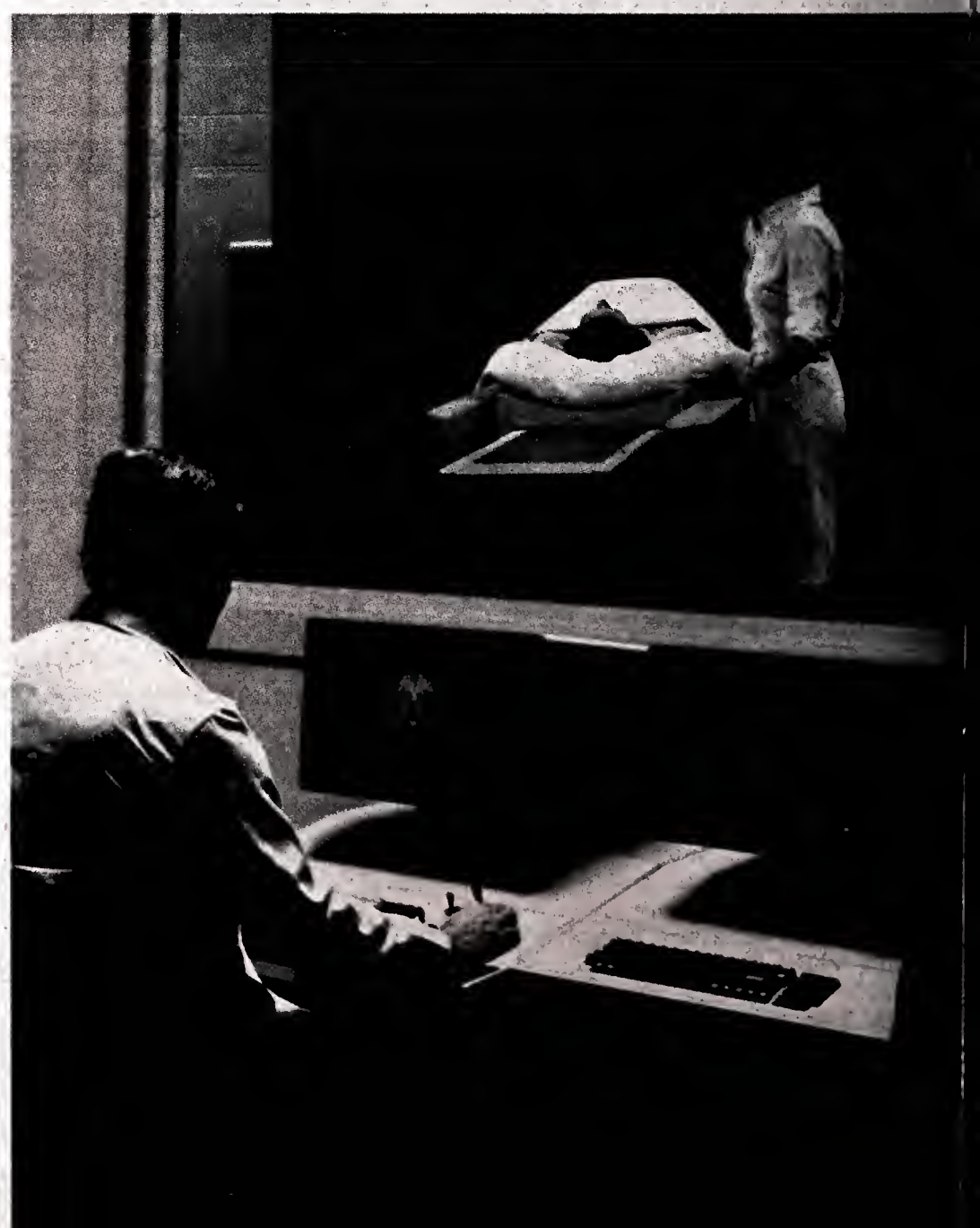
"We chose Perkin-Elmer for speed, compute power and huge I/O capacity. Now we're reaping the benefits."

KEVIN KENNY

Kevin Kenny is President of J.J. Kenny Co., Inc., the municipal bond industry's largest "broker's broker." Trading through a network of 750 satellite-linked terminals, Kenny has cataloged a descriptive database (MUNIBASE) for an incredible 1.5 million issues.

The operation depends on powerful Perkin-Elmer 3250 superminicomputers, performing multi-processing tasks, over 2,000 real-time transactions per day (up to $200 million), plus batch processing of updated issues overnight.

As J.J. Kenny has grown, the system has grown with it. To Mr. Kenny that's meant solid investment protection. "Though our database has expanded considerably, we've never had to change the basic software."





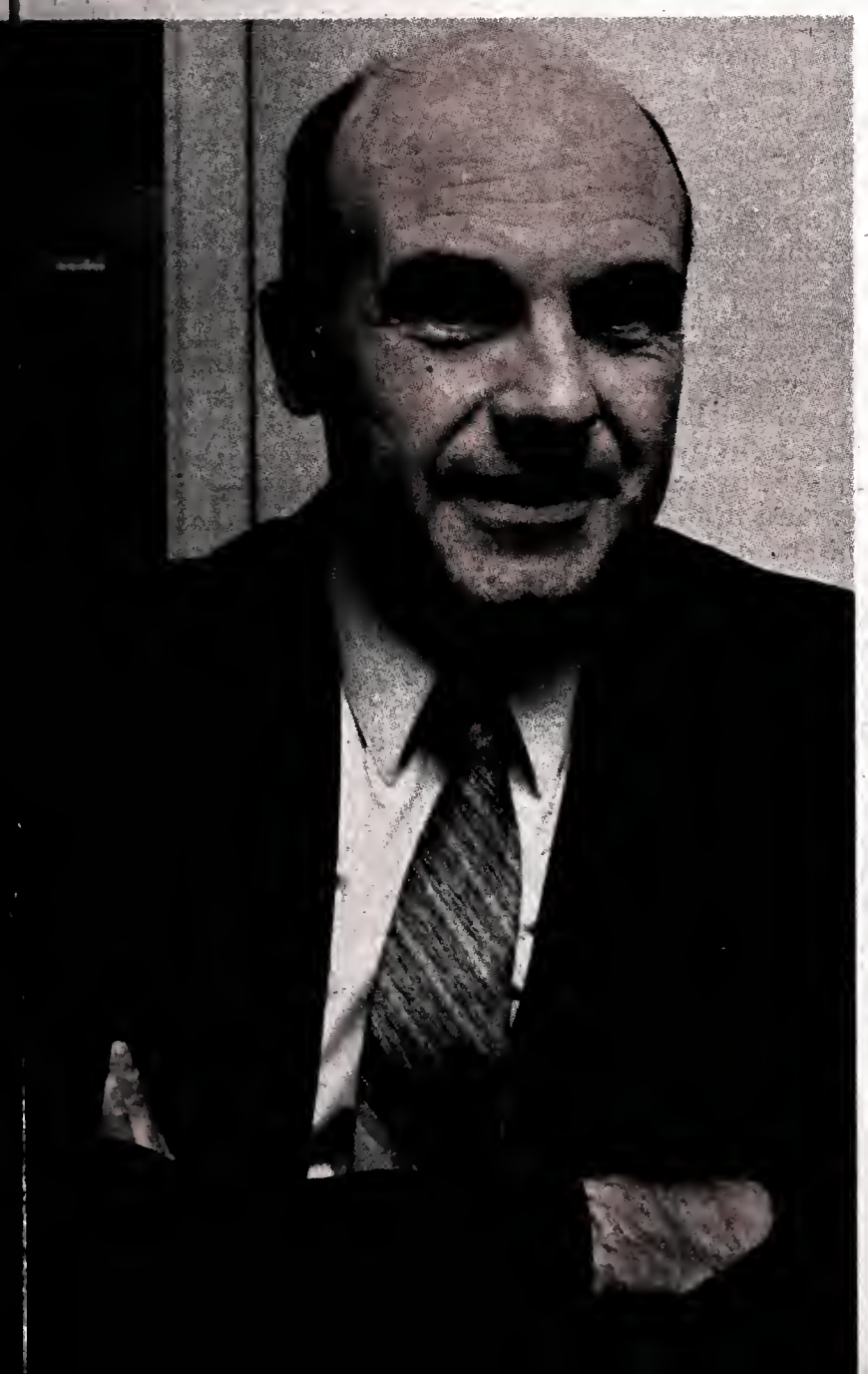
"I've never seen more reliable hardware. We've never had to switch over to the back-up system."

ROBERT DeVIVO

Manufacturers Hanover Trust Co. Assistant Vice President Robert DeVivo chose Perkin-Elmer superminis to optimize the banking giant's Automated Teller Machine (ATM) capability.

With two processors—one on-line and the other for batch and back-up—the state-of-the-art system now handles 165 ATMs, as well as communications for ATM sharing through the Cirrus network. With virtually no downtime.

Beyond reliability, Mr. DeVivo emphasizes vendor support. "Perkin-Elmer takes the time to understand our needs; they are responsive and willing. We have made the right choice, without a doubt."



"In a life-or-death emergency, accurate diagnostic data is needed in seconds. No other machine in its price range has that kind of computational power."

CARL BRUNNETT

As Technical Director of Picker International, Carl Brunnett has primary design responsibility for Picker's Computed Tomography (CT)—or "Cat Scan"—systems. For the past 10 years, he has depended on Perkin-Elmer computers.

The Picker CT Scanner converts 2 million data points into a high resolution image in just 12 to 22 seconds. With leading-edge throughput and image quality, Picker systems utilize their 32-bit processor's exceptional data handling capabilities through incredibly sophisticated software.

"Upward compatibility has enabled us to improve performance," Mr. Brunnett added, "without having to change the computer. The Perkin-Elmer has more than enough power for expandability."

These are Perkin-Elmer people. All computer-knowledgeable. All leaders in their fields.

If that's where you want to be, get in touch with us.

Call toll-free **1-800-631-2154.**

Or write The Perkin-Elmer Corporation, Two Crescent Place, Oceanport, NJ 07757.

PERKIN-ELMER

WORK from SR/10

telecommuters who regularly spend several days a week off-site.

It is easy to take potshots at some of these smaller micros — by anyone's standard they are not as easy to use or as full-featured as their larger office-based counterparts. If this market is given time to develop, however, small machines priced and designed to be remote-site workhorses will probably be available.

■ The wired work group. There is something new in the products and sales pitches from OA vendors within the last year. They are realizing that there is a middle group between individual work and divisionwide or companywide work. Micros had been aimed at the former and traditional DP systems, with updated OA features, at the latter.

As most office workers know, the immediate work group of 12 or more people is where most of the work gets done and most of the communications flows. Systems that tie together micros, file servers and printers in cohesive local networks will be well matched to the organizational reality of group work.

The advent of new micro-based systems like these — such as Apple's Macintosh Office — is another reason why telecommuting can grow. One of the myths about telecommuting is that it only means work at home; other remote sites, such as satellite offices or so-called neighborhood work centers, are just as likely and offer unique advantages.

■ Micros as commodity items. The initial push for cost-justification of individual micro purchases seems to be over at many organizations. The machines are cheaper, they are less of a novelty, and — most important — it is becoming clear how useful they are.

Ironically, as micros move up the organization ladder, it becomes harder to identify tangible benefits. Dennis Devlin, manager of emerging technologies at American Hoechst Corp., characterizes attempts to measure managerial and executive payoffs from micros as trying to count "insights per fortnight." In most cases, the benefits are there and are obvious to the people who rely on micros. The effort and cost needed to prove this can exceed the cost of the micro itself; thus, within reason micro purchases are almost an act of faith.

This leads to much wider availability of micros and acceptance of their role as necessary business tools for many office workers. Coupled with the reasons above, this means more and more people are potential telecommuters. Their work and their jobs can be as portable as they like.

■ Micros as dumb terminals. It is probably heresy to say this, but many micros are used as dumb terminals much of the time. They are not dumb terminals in the sense of a $500 box with no computing power or internal logic — but what else would you call a micro that is used extensively for E-mail or data base access? Everybody using micros is not creating elaborate Lotus Development Corp. 1-2-3 models or using word processing software to write 20-page reports.

As the cost gap between terminals and low-end micros narrows, there is little reason not to buy a micro when faced with the choice. The computing power is a freebie — if it is used now and then, so much the better.

The person working at home will often use the micro for terminal-like purposes such as E-mail or file access. Many telecommuting professionals, such as financial analysts, certainly need the micro as a computer, not as a terminal. But others do not — much of their work may even be paper-and-pencil tasks for which the micro is only a part-time resource, used mostly for communications with coworkers and others in the central office.

Telecommuting possibilities

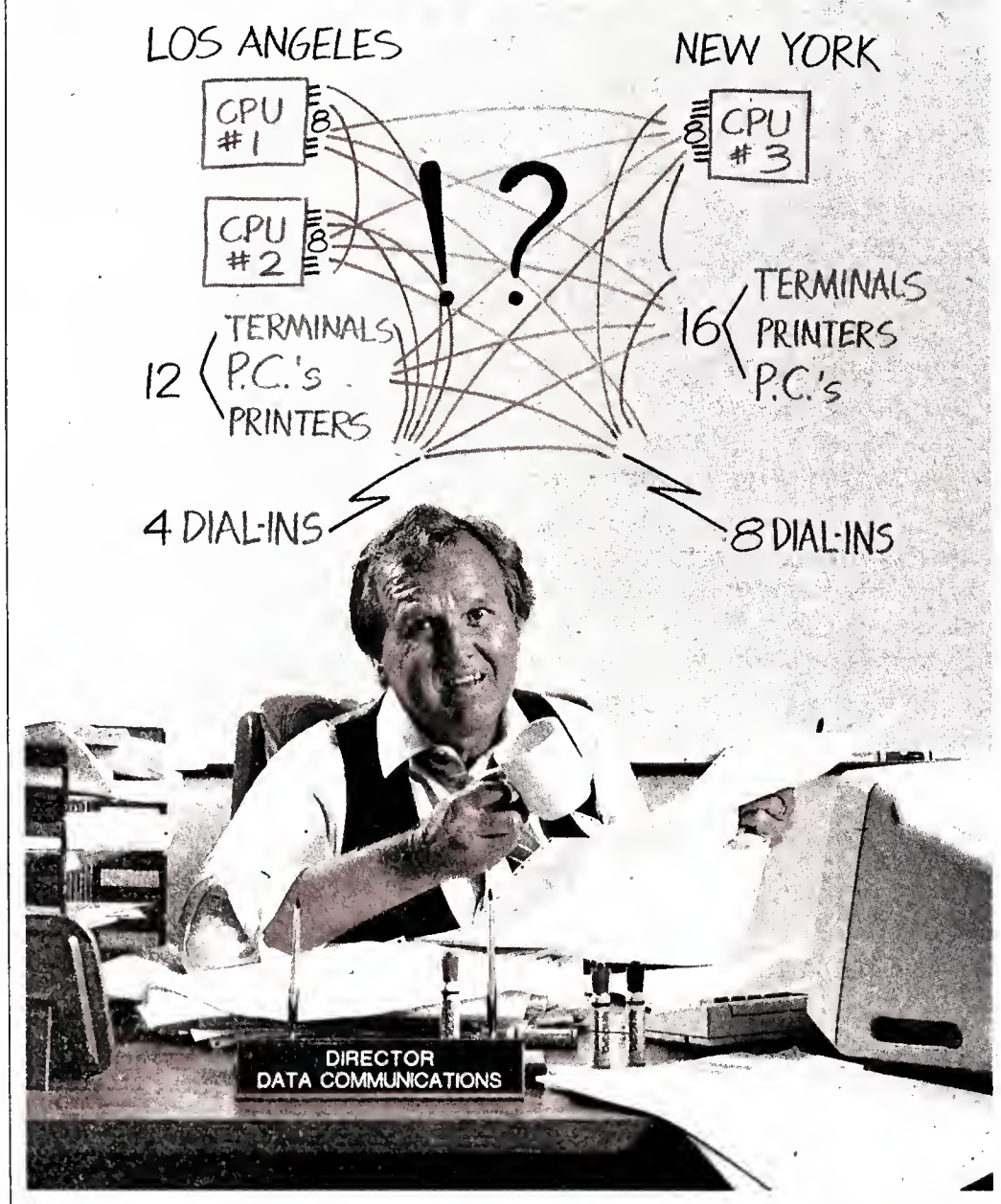
Even without widespread use of micros, it is entirely possible for most organizations to have up to 5% of the office work force telecommute at least several days a week.

Actual telecommuting applications today are growing quickly but are still limited, mostly because of its novelty and some misconceptions about its purposes, benefits and implementation.

The growth of micros is one factor that helps explain why some observers say they believe that 15% to 20% of the office work force could be telecommuting by 1990.

COMDESIGN SWITCHING STATISTICAL MULTIPLEXERS: TS-600 SERIES

WE SOLVE THESE PROBLEMS EVERY DAY.



Struggling to tie everything and everyone together without sacrificing performance or breaking the bank? Let your stat mux do it for you!



Get everyone into the act with the new TS-600 Series.

If increasing demand for computer ports and distributed resources has your system in a stranglehold, there's no limit to the breathing space you could enjoy with the TS-600 Switching Stat Mux.

The newest addition to the ComDesign family of networking products, the TS-600 Series provide the same cost savings and network control as the popular TC-500A. With no limit to the number of users who may contend for any available ports, the TS-600 offers all the features of a data switch, port contention unit and intelligent statistical multiplexer in one.

When used individually, a TS-600 acts as a port selector and front-end processor, permitting local resource sharing. Connected in pairs, TS-600's become the central point of control in a powerful transparent switching network, concentrating up to 32 devices over a single communications link. ComDesign's modular hardware and firmware plan allows for easy network expansion and access to the latest software developments.

The TS-600 Series multiplexers are designed for ease of use, and are available with integral 4800 or 9600 bps modems. For more information on the new TS Series or for help with any data comm problem, call us. Toll-free (800) 235-6935, or in California (800) 368-8092.

ComDesign
Leaders in Data Communications
751 South Kellogg Avenue
Goleta, California 93117
(805) 964-9852

IDEA IS SHIPPING A 5250 TWINAX EMULATOR WITH A UNIQUE FEATURE.

IT WORKS.

Last Fall, two major companies announced a twinax board for PC-to-IBM System 34/36/38 communications. Today, only one company is shipping a product that's fully functional: IDEA.

Unlike our competition, the IDEAcomm 5251 twinax board comes complete with software. This may explain why the thousands of units shipped since December are making IDEAcomm 5251 the industry standard worldwide.

You'll also find many third-party software packages for the System 3X supporting our board: Decisionlink™ and Intelink,™ for example.

But our customers have found lots of other reasons to choose IDEAcomm 5251.

We provide a "hot key" capability, hard disk access, printer support, four concurrent host sessions, and data transfer. Plus, our customers who benchmark IDEAcomm 5251 tell us that it's incredibly fast.

And IDEAcomm 5251 does all this and still requires only 30K of memory on your PC.

So if you want a 5250 twinax emulator with performance rather than a promise, call IDEA at **800-257-5027.**

IDEAssociates

The best IDEAs for personal computers.

IDEAssociates, Inc., 35 Dunham Road, Billerica, MA 01821
(617) 663-6878 Telex 94-8245. IDEAssociates S.A., 5, Route de Chêne, CH1207 Geneva, Switzerland (22)86.11.19 Telex 428 388 KBSCH

The communications standard.

Decisionlink is a trademark of Laguna Laboratories, Inc. Intelink is a trademark of Marcam Data Systems Corporation.
IDEAcomm 5251 is a trademark of IDEAssociates, Inc.

Special Report

The information center: one approach to data security

By William M. Adney
Special to CW‡

Security, a challenging problem in the mainframe environment, has an added dimension of complexity with microcomputers: their location. The computing resource is now outside the safe and secure protection of a computer center. Micros can be found in executive offices, on clerks' desks and even on the factory floor.

Another facet of this problem is that these micros are also inexpensive enough to be purchased by individuals for home use. While all of this may be viewed as providing a significant increase in employee productivity, it is a double-edged sword because vast amounts of confidential company data can be copied onto a diskette with little or no chance of detection.

That information can be taken home either by an honest employee for work purposes or by a disgruntled employee for sale to a competitor. And, we usually find that the bigger the company, the bigger the problem.

Control is key

The key to solving the problem is to ensure that senior company management is aware of the size and scope of the problem as well as its potential security threats, such as disgruntled employees, mistakes, lawsuits and fire. The solution is clear: Management should be aware that the microcomputing resource, like any other company resource, must be controlled. And company resources — time, money and personnel — must be dedicated to finding this solution.

One approach used in many corporations to deal with the issue of microcomputer security is the development of an information center. The purpose of the information center is to make data readily available to users. Although this can be accomplished with appropriate training in a mainframe environment, the information center typically includes a mix of small mainframe and microcomputer technology.

> *The solution is clear: Management should be aware that the microcomputing resource, like any other company resource, must be controlled.*

The information center provides an appropriate focus for user information processing. One of its primary responsibilities is to centralize the purchase of both microcomputer hardware and software. Standard policies, acquisition procedures and software/hardware support should also be provided.

This centralization process provides the coordination required to ensure that an organization does not end up with a lot of useless hardware and software that simply gathers dust in offices and on desks.

The information center should be an organization that will work closely with, yet independent from, the data processing function. Do not give the already overburdened manager of your major data processing center the added responsibility of the information center.

Information center personnel must also work closely with an information security organization to ensure that the center's policies and standards are consistent with the company security policies and procedures.

In addition, the information center must be user-friendly.

In order to establish standards, for example, the data processing manager's advice must be considered, but it should not necessarily be the final word. Why? Consider the following scenario. Company X's policy is that all microcomputers must be manufactured by the same company. (This is actually not an unreasonable policy, considering all of the different types of microcomputer operating systems, disk sizes and formats and applications software. Many data processing specialists recommend equipment consistency as a good starting point).

A few months or years later, a user group has a very specific application requirement for some software that only runs on another brand of microcomputer. But the company policy is that only one brand of micro is standard.

In this case, with the current evolution of micro technology, the policies of the information center should be flexible within certain limits. The purpose of microcomputing in the office is to improve productivity, not stifle it.

See **SECURE** SR/38

Adney is a senior consultant with Total Assets Protection, Inc., a management consulting firm specializing in computer security and disaster recovery, based in Arlington, Texas.

How To Triple The Speed Of Your 3270 Printer



Another Smart Solution From AVATAR

It's a sad sight. Seeing your IBM 3270 printer falling further behind every day. Outpaced by ASCII printers that deliver far greater performance at a much lower cost. ASCII printers that, until now, didn't link to your 3270 system.

Enter AVATAR's PA1500 protocol converter. It lets you attach virtually any ASCII printer directly to your 3270 network with a simple coax connection – including printers that are three times as fast as your IBM printer and cost half as much.

Now you can select the printer that matches your system needs. For greater speed, letter quality printing, better performance. Fast dot matrix or line printers. Bar code or graphics printers. Even the newest ink jet or laser printers can be a part of your 3270 network.

Together, the PA1500 and the printer of your choice give you all the capabilities of your IBM printer...and more.

So get yourself an AVATAR PA1500. And bring your 3270 printer up to speed.

AVATAR
An Orange Nassau Electronics Company

The Link That Thinks

Avatar Technologies Inc.
99 South Street
Hopkinton, MA 01748
(617) 435-6872

Allied Computer Group (414) 961 8808
Computer Communication Connection (213) 306-5469
Digital Computer Products (415) 349 5699
Office of the Future (215) 988 9157
Servitronics (313) 273 0936

International
France Belgium
ISTA-Imatic (01) 630 21 46
Sweden
Databolin (08) 714 00 00

Butler Associates (617) 964-5270
Data Aids Associates (713) 353-7728
Epson Great Lakes (313) 281-2800
Polygon Associates (314) 576-7709
WA Brown Instruments (305) 776-4800

Australia/New Zealand
Datatran (03) 729 2844
Italy
Mactronics (02) 68 82 141
UK/Ireland
Interlekt Electronics (0734) 589551

Capital Systems (703) 892-1150
Data Processing Sciences (513) 961-0776
Innovative Computer Marketing (803) 288-2422
Portable Computer Systems (609) 429-6162
XPOINT (404) 446-2764

Canada
Ahearn & Soper (416) 675-3999
Norway
Norwegian Data Comm (02) 68 89 83
W. Germany/Austria
Stemmer Elektronik (089) 80 60 61

All product information is subject to change without notice.

© 1984 Avatar Technologies Inc. IBM is a registered trademark of International Business Machines Corporation.

DBM II TAKES OVER MAJOR CORPORATIONS

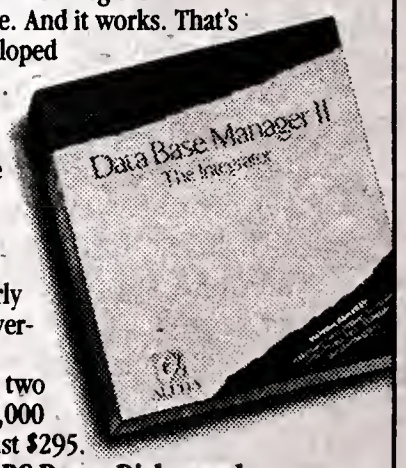
Each day, more and more companies are standardizing their PC data base software with ALPHA® Software's Data Base Manager II – The Integrator™

And for the best possible reasons. It's simple to use. And it works. That's why PC Magazine said, "DBM II must have been developed for business people who want nothing to do with becoming computer literate and everything to do with easily running business applications."

And why InfoWorld said, "A product of the future is available today in DBM II."

DBM II is a menu-driven file management system that also integrates directly with 1-2-3,™ Multiplan,™ WordStar,™ MultiMate,™ dBASE II® and III,™ and nearly any other IBM® PC program. And it includes the powerful keyboard macro facility called AlphaKEY.™

What's more, DBM II is already proven, with over two years as a leading PC file manager, and more than 40,000 copies hard at work around the world. And it costs just $295.



For a copy of the Data Base Manager II IBM PC Demo Disk, send $3.00 or call us at 1-800-451-1018 (in MA call 1-800-462-2016).

ALPHA® SOFTWARE CORPORATION

ALPHA Software Corp. is a registered trademark. © 1985 ALPHA Software Corp., Burlington, MA 01803. ® signifies companies' registered trademark; TM signifies company trademark. Permission to publish quotes granted from respective publishers.
ALPHA Software Corporation, 30 B Street, Burlington, MA 01803.

In June, we'll help you turn out profits on an assembly line.

Manufacturing industries are getting more competitive every day, with enormous pressures to improve productivity methods. Which is why so many manufacturing companies are beginning to see the true potential of increased computerization.

And the result is new partnerships between MIS/DP, production, and design management. So in the June 19th issue of *Computerworld Focus,* we'll tackle industrial automation, one of the fastest growing segments of the computer industry today.

We'll put CAD/CAM, robotics, local area networks and MRP in perspective. Then discuss ways to link dedicated manufacturing computers with the corporate information system to integrate the entire process, from engineering design to assembly to quality control to inventory control to shipping to billing all the way to accounts receivable.

And we'll reach more than 126,000 paid *Computerworld* subscribers with that information. Not to mention our high pass-along readership. As well as bonus distribution at Advanced Manufacturing Systems'85 in Chicago.

But that's not all you'll get for your advertising dollar. Because Starch INRA Hooper will be performing a detailed advertising readership study on our June issue.* So you can see how effective your ads are. And how effective your competitions' ads are.

So if you want to mass produce profits, your chance is here. Get your ads in Focus. *Computerworld Focus* on Manufacturing. The June 19th issue, closing May 10 (materials due one week later).

For more information, contact Ed Marecki, National Sales Director, *Computerworld Focus,* 375 Cochituate Rd., Framingham, MA 01701. Or call (617) 879-0700.

*A minimum size of 7″ x 10″ (500 lines) is required for ads to be eligible for a Starch study.

COMPUTERWORLD FOCUS

We put the hottest issues of the day in Focus.

A PUBLICATION OF CW COMMUNICATIONS

BOSTON: (617) 879-0700 **NEW YORK:** (201) 967-1350 **ATLANTA:** (404) 394-0758 **CHICAGO:** (312) 827-4433
SAN FRANCISCO: (415) 421-7330 **LOS ANGELES:** (714) 261-1230 **HOUSTON:** (713) 952-1220

Special Report

Simple security precautions ensure information safety

Many of the same security concepts that are available and implemented in the mainframe world also apply to the micro. The basic difference is the way that the security is implemented.

It is important to note that microcomputer security precautions do not need to be complex, in fact, the simpler the better. Simple and effective security requirements are more likely to be implemented. The information protection program for microcomputers contains the same elements — physical security, information security, and disaster recovery — as its big brothers in the mainframe world.

Physical security of the equipment must be ensured. If all of your micro users do not have offices that can be locked, a reasonable policy is to equip them with the appropriate anchoring hardware that will secure the microcomputer systems to their desktops.

If the equipment must also be portable, another alternative is to obtain a locked cabinet specifically designed to protect the equipment.

Information security is more difficult to deal with. Security software for the mainframe can control user identifications, passwords and access to data, but there is no equivalent for the micro. Although there is at least one add-on board for the IBM Personal Computer which provides hardware encryption for all data written to a disk, it is at best naive to believe that this is the solution to information security. Encryption boards can be easily obtained by anyone — an honest or a dishonest employee.

Simple is best

There are still a number of ways to implement effective information security. It can be as simple as a policy that requires that floppy disks be placed in a locked cabinet or desk every night. Hard disk systems are a little more difficult to protect, but simple is best. A key lock on the power supply for the system is an effective measure.

What about the problem of allowing employees to take computerized information home? In the case of micros, that may not be a good policy. But more important, there are legal and security problems associated with home use of computerized information.

Floppy disks may not only contain data; they may also contain the application software used for that data. More and more software manufacturers are bringing lawsuits against large companies for copyright infringements.

How do you control the data that is on these disks? One way is simply to prohibit employees from taking any floppy disks out of the office. This is not a very realistic policy to be sure, but it is one approach. Searching briefcases and purses is not enough — you might have to resort to a strip search to find a 3½-in. floppy disk. This is not the way to maintain a good relationship with employees.

It may be appropriate to have a policy of providing software to employees for home use, particularly when they are working on company business at home.

An effective way to offer this support is to allow the information center to make hardware and software available to employees at reduced cost.

SECURE from SR/36

One of the most important issues the information center must address is information security.

How do you approach this crucial issue? Most companies have established an information protection program that is the responsibility of an information security officer. Within the security context, this officer and the information center must work together to ensure that the required amount of security is available for the microcomputers.

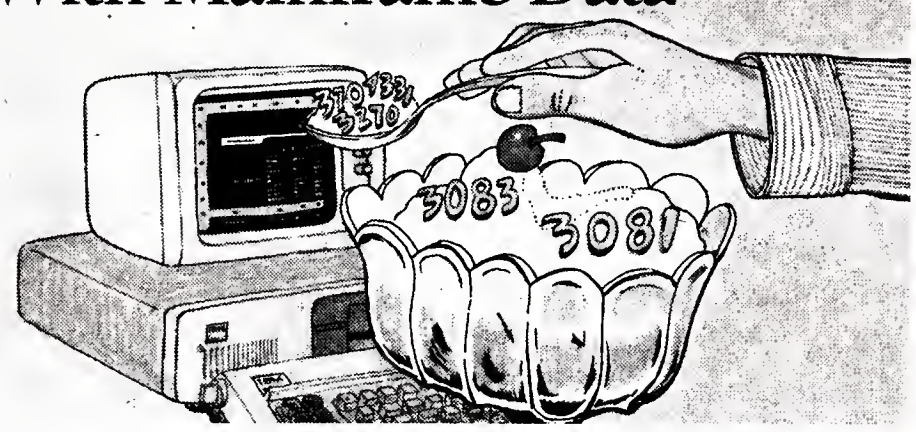
Disaster recovery must also be considered for microcomputer systems. Documented disaster recovery procedures are probably more important for a micro than they are for a mainframe system. A single user mistake in a system command can erase hours, days or weeks of work. All data and software should be copied to backup disks and stored in an offsite location. Additional backups should be available at the work station. And don't forget the documentation itself, especially for user-written application programs.

The final key to the success of implementing microcomputer security is the enforcement of the standards, policies and procedures developed through the information protection program and the information center. In many large firms, it is not unusual to find that many managers have approval authority for purchases that is sufficient to buy a microcomputer system and software without the knowledge of the information center or any other organization.

It is imperative that policies providing strict penalties for the unauthorized purchase of computer resources be implemented and enforced. Since the information center will not have sufficient personnel to accomplish everything, the audit department can help provide the follow-up and reporting during routine audits.

Implementing effective microcomputer security is a complex problem. But it can be solved through management awareness of the problem, dedication of company resources to solving the problem and control of the microcomputer resource.

How To Delight Your Lotus With Mainframe Data



Another Smart Solution From AVATAR

The idea is simple. Make your PC spreadsheet even more powerful by giving it mainframe data. But getting that data out of your mainframe, into your PC and onto your spreadsheet isn't that simple.

Until now, you've had three choices. Transfer entire files from the host and risk choking your PC with data. Not very efficient. Or find the information in printed reports, then reenter and reformat it. Very tedious. And the alternative of asking your DP department to write special host software...well, they're overburdened already. Three choices, no real solution.

Now there's TURBO, the newest micro-to-mainframe link from AVATAR.

TURBO's Data Capture lets you select just the information you need from the mainframe. And use it immediately in any of your PC applications – Lotus, dBASE, you name it. Without rekeying, reformatting, re-anything.

And you can use TURBO's host-assisted File Transfer the way file transfer was meant to be used – for sharing data with other PC users on the 3270 network.

If that isn't enough, TURBO's exclusive Macro Language adds a whole new dimension to your micro-to-mainframe link. Use Macros to automate file transfer and data capture. Better yet, massage host data even before feeding it to your spreadsheet.

So give your PC a TURBO from AVATAR. And delight your Lotus with mainframe data.

AVATAR

An Orange Nassau Electronics Company

The Link That Thinks

Avatar Technologies Inc.
99 South Street
Hopkinton, MA 01748
(617) 435-6872

Allied Computer Group (314) 961-8808
Computer Communication Connection (213) 306-5469
Digital Computer Products (415) 349-5699
Polygon Associates (314) 576-7709
WA Brown Instruments (305) 776-4800

International
France Belgium
ISEA-Imatic (01) 630-2146
Sweden
Databolin (08) 734 00 00

Butler Associates (617) 964-5270
Data Aids Associates (713) 353-7728
Innovative Computer Marketing (803) 288-2422
Portable Computer Systems (609) 429-6162
XPOINT (404) 446-2764

Australia New Zealand
Datatran (03) 729-2844
Italy
Mactronics (02) 68 82 141
UK Ireland
Interlekt Electronics (0734) 589551

Capital Systems (703) 892-1150
Data Processing Sciences (513) 961-0776
Office of the Future (215) 988-9157
Servitronics (313) 273-0036

Canada
Ahearn & Soper (416) 675-3999
Norway
Norwegian Data Comm (02) 68 89 83
W. Germany/Austria
Stemmer Elektronik (089) 80 60 61

All product information is subject to change without notice.
© 1984 Avatar Technologies Inc. Lotus is a registered trademark of Lotus Development Corporation. dBASE is a trademark of Ashton-Tate, Inc.

IMPROVE YOUR PC INVENTORY CONTROL WITH

PC TRACKER®

A proven software package for keeping track of PC's, software, peripherals and accessories. It's accurate, flexible and easy to use. PC TRACKER gives you quick answers about your inventory:

Where are they... How many... What kind... What's the warranty/maintenance contract status... Who was the vendor... When were they purchased... For how much... What are the oustanding PO's? etc., etc., etc.

Now the just announced Version 2.0 PC TRACKER brings you even more expanded facilities. For example, you get powerful "Ad Hoc" search capabilities, and comprehensive summary as well as detail report formats.

This sophisticated management database system offers a large number of unique beneficial features that add up to solid application value. Even a "Tickler" message file that helps you better serve the needs of your PC "clients" within your organization.

PC TRACKER runs on IBM PC, XT, AT or compatible systems that have 256K or more, 2 disk drives, and DOS 2.0 or greater... comes ready to use, complete with a "starter" product file containing several hundred popular products... and much more.

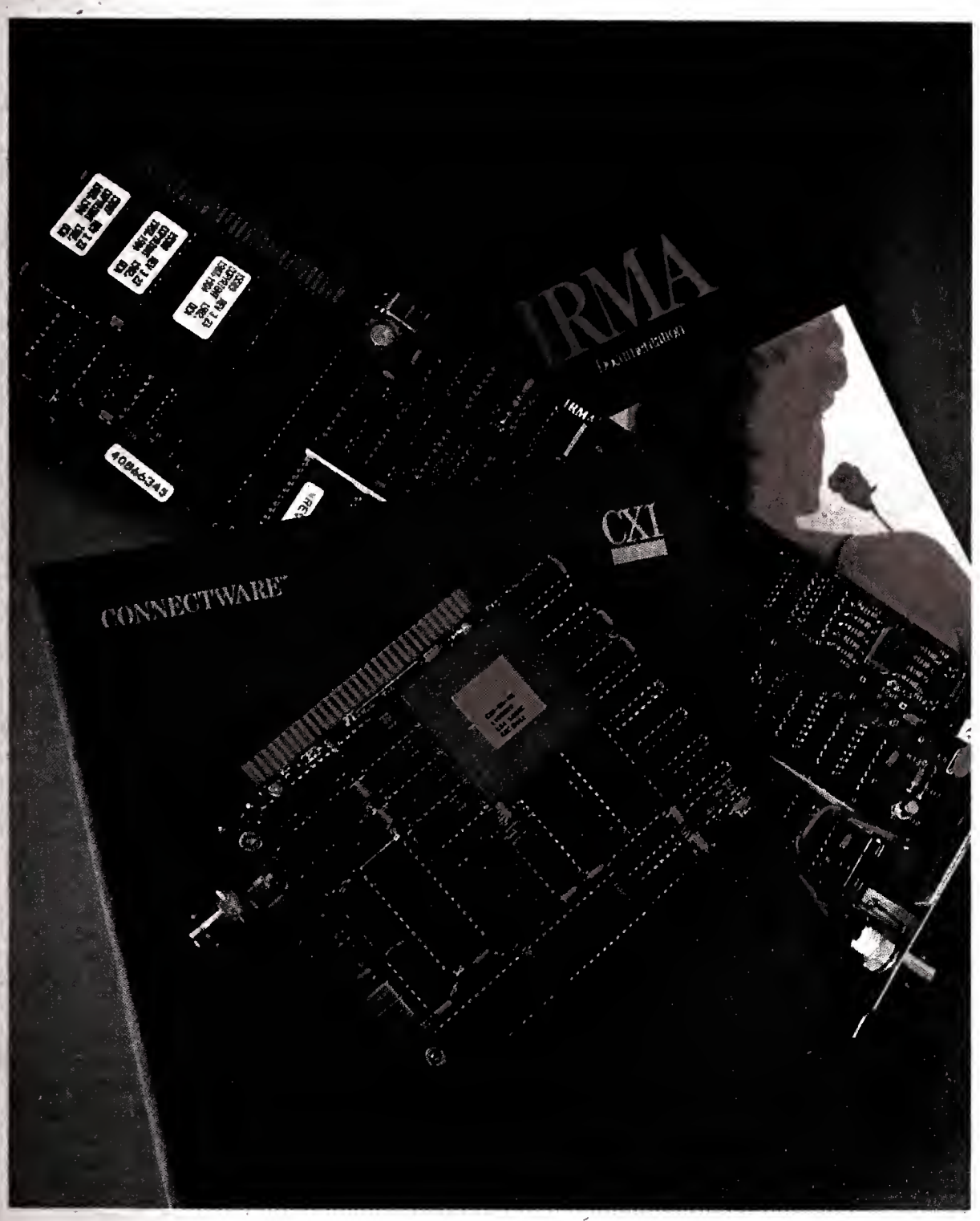
Why not find out how easily and quickly you can gain improved control of your PC environment today for only $495.00!

Simply call (215) 576-0970 or write for more detailed information and a free product brochure.

RG SOFTWARE SYSTEMS, INC.

Beverly Ann Glath
RG Software Systems, Inc.
P.O. Box 426
Fort Washington, PA 19034

CXI is now compatible with what's-her-name.



That's good to know.

It means the CXI 3278/79 PLUS coaxial connection is now 100 percent compatible with IRMA.™ So you can add our new hardware to your network and run all the same software she runs. Without changing a thing.

Not your mainframe application software. Not your PC software. Not even old what's-her-name.

So if nothing changes, why go with CXI?

Simple.

Our CXI 3278/79 PLUS emulator gives you more to work with. You get one host session, one PC DOS session and two notepads. All on the same screen at the same time. No toggling back and forth between sessions. And no wasted effort whatsoever.

We're easy to connect, too. Just slip our 5-inch board into any available slot—even a short one—on your IBM® PC, XT, AT or compatible. Attach the coaxial cable to a 3274/76 cluster controller. And start sharing information direct with your mainframe.

You should know, too, all our products are now soft-loaded. Not PROM-based like IRMA. So when it comes time to upgrade, you simply insert a new floppy. Instead of new PROMs.

And that goes for our new 3278/79 STANDARD connection as well. It's feature-for-feature identical to IRMA. Except for one thing.

It costs up to $300 less.

Interested? For a brochure about these and other CONNECTWARE™ micro-to-mainframe solutions, call us at 800/221-6402. In California, call 415/424-0700. Or write CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.

We'll make you forget all about old you-know-who.

We don't have all the answers, just more of them.

CXI

CONNECTWARE is a trademark of CXI, Inc. IBM is a registered trademark of International Business Machines Corp. IRMA is a trademark of DCA, Inc. © 1985, CXI, Inc.

Special Report

Identify costs, conduct thorough product evaluation

By James Huling
Special to CW‡

The selection and acquisition of microcomputer software normally begin with two assumptions: first, that the purchase price of the package represents the total cost of the system and, second, that the selection process does not require the intense evaluation associated with mainframe package acquisitions. Both assumptions are wrong.

These assumptions lead to systems that at best do not meet the needs of the user or at worst do not work. The latter systems are the more costly because the software must be shelved and the entire selection process begun again.

Managers should consider hidden costs — such as those associated with conversion, training and maintenance — when they evaluate micro software packages.

The key to avoiding these problems lies in identifying the costs involved in acquiring and implementing microcomputer software and in understanding the steps necessary to conduct a thorough evaluation.

Identifying costs

The purchase price of micro software is so low that total project cost is seldom examined closely. Often, hidden costs become visible only when a decision is made to abandon a particular package and start again. The need to identify these costs in advance is a strong recommendation for a careful selection process.

Conversion costs. One cost that is easily overlooked is that of conversion. Many projects involve replacing existing applications with new and better systems. To implement the new system, MIS managers and their selection teams must devise some means of transferring information.

Means of transferring data range from having users re-enter information to developing programs that will perform conversions and transfer data. Either method brings on significant costs, particularly if programming must be done on a contract basis.

Training costs. Another cost that managers seldom evaluate in advance is training, for which methods range from simply studying vendor documentation to completely relying on vendor-supplied courses.

Although the costs for vendor training at first seems higher, hindsight often reveals that the other option, the trial-and-error approach, exacts a heavy toll in terms of frustration and problems that may require significant effort to correct. Thorough and informative training, whether by the vendor or by in-house personnel, will save time and money over the life of the system.

Support costs. A final cost the manager must consider before acquiring a particular software package is support. Many vendors will support their systems for an annual fee, usually some percentage of the purchase price. This can be a great advantage, especially if the system must incorporate changes such as those in tax laws or in government-imposed reporting.

Managers and their acquisition teams, however, must give careful consideration to the contractual maintenance agreement. The purchaser's expectations usually exceed the vendor's obligations.

In the absence of a maintenance agreement, the manager must set up some means of in-house support. This may involve hiring a full-time programmer or using contract programmers as problems arise.

The hardware manufacturer or computer retailer that sold a firm its microcomputers can provide the names of individuals who are familiar with the system and perhaps with the software under consideration.

If managers consider hidden costs — such as those associated with conversion, training and maintenance — when they evaluate micro software packages, they will avoid problems that might otherwise arise after the purchases are made.

Conducting an evaluation

Although the total cost of microcomputer software is significantly less than that of mainframe software, the evaluation and selection processes should be no less thorough. According to H.L. Mencken, "For every problem, there is one solution [that] is simple, neat and wrong." When an organization does not understand its requirements, a software package may appear to be a simple and neat solution. It can also be wrong.

Huling is a systems analyst and project leader with Vulcan Materials Co., a Birmingham, Ala.-based chemicals and materials company.

CHANGE THE WAY YOU DESIGN SYSTEMS

Excelerator brings computer-aided design (CAD) to software engineering by automating the job of developing systems specifications.

Excelerator provides facilities for creating data flow diagrams, data model diagrams, structure charts, presentations for end users, report mockups, and screen mockups. Special analysis reports validate the logic and completeness of your data flow diagrams automatically. The extended data dictionary stores all the information about your specification, including record and file layouts, data elements, and relationships, so that you can cross-check all aspects of the system specification for completeness and accuracy. Facilities are also provided to pass data to and from other data dictionaries. An integrated report writer and document preparation facility allow analysts to generate mini-specs for project reviews or the complete specification document ready to deliver to clients. Excelerator provides an interface to most of the popular word processing packages.

Your specification is more complete and consistent than using manual methods — and finished in a fraction of the time.

Excelerator is the most complete workbench for the systems analyst available on the IBM PC-XT, 3270-PC, and PC-AT.

Excelerator™



InTech™

Index Technology Corporation Five Cambridge Center Cambridge, MA 02142 617 491-7380
Midwest Citicorp Plaza 8410 West Bryn Mawr Avenue Suite 400 Chicago, IL 60631 312 380-1226
New York Region One Bridge Plaza Suite 400 Fort Lee, NJ 07024 201 585-0662
Northern California 1250 Oakmead Parkway Suite 210 Sunnyvale, CA 94086 408 732-0690
Southern California 18662 MacArthur Boulevard Suite 200 Irvine, CA 92715 714 955-1160
MidAtlantic 7927 Jones Branch Drive Suite 400 McLean, VA 22102 703 442-8202
Southwest Regency Centre II, 5501 LBJ Freeway Suite 500 Dallas, TX 75240 214 392-9930
Southeast 400 Perimeter Center Terrace N.E. Suite 650 Atlanta, GA 30346 404 396-4159

Now available through your local IBM branch office

Excelerator, the Excelerator symbol and InTech are trademarks of Index Technology Corporation.

IBM and IBM PC-XT are registered trademarks of the International Business Machines Corporation.

Special Report

before picking microcomputer software packages

Requirements study. The first step toward a successful package selection and acquisition is a requirements study. MIS managers' documentation of the needs of their businesses is essential to the selection of the right system for a particular application.

The most useful sources of information are the individuals who will use the system. Managers and members of their acquisition teams should conduct interviews with as many potential users as possible.

If the new system is to replace an existing one, interviewers should note both the problems and the benefits of the current system. During this stage, they should particularly aim to uncover the current system's assets; it is more difficult to determine what is right about a system than what is wrong.

Requirements checklist. After the team conducts user interviews, its members should document requirements in the form of a checklist, grouping them in three categories: "absolutely must have," "would like to have" and "interested if available." A checklist enables the manager to determine quickly whether a particular system meets the organization's needs.

Vendor selection. After the checklist is prepared, managers should obtain from their organizations' micro hardware manufacturers a list of vendors that supply software for the machines. Magazines, retail computer stores and computer organizations provide additional sources for this information.

The critical element is that the software must run on the hardware an organization has on hand. Managers and their acquisition teams should eliminate any software that is not already operating on that hardware. Software vendors may offer their packages at reduced prices, but the effort and frustration of being a test site will outweigh the savings.

Another aspect of this phase of software selection is evaluating vendor reliability. This is particularly important with microcomputer software; many vendors will not be in business six months from now when needs change and enhancements are required. A careful choice of vendors helps ensure that a package's quality will be maintained in the future.

If an organization obtains information from knowledgeable and reliable sources, it will reduce the risk of selecting the wrong vendor. Managers and their acquisition teams should select from the list of available software no more than five packages for evaluation. Any more than five will encumber the evaluation and delay the results. As one of the five is eliminated, another may be substituted.

Software selection. Managers and their acquisition teams should make use of as many means as possible (see story SR/42) for evaluating a particular micro software package against their organizations' requirements checklist.

After various software packages have been examined, only two areas of evaluation will remain: hardware limitations and cost.

Hardware limitations. To evaluate the new system's impact on an organization's hardware, the manager must estimate the space needed to store data, the memory needed to execute programs and the resources needed for capabilities that are not currently in use.

> *The most useful sources of information are the individuals who will use the system. Systems acquisition teams should conduct interviews with as many potential users as possible.*

Costs. Managers and their acquisition teams should examine costs only after all other phases of the evaluation are complete. Only then will they know for what they are paying.

After each system has been evaluated as to its capabilities and costs, the manager can make comparisons and choose a software package.

Acquisition project managers should also consider two final points:

First, if a system does not fit the needs of an organization, the manager should resist the temptation to change the software and should, instead, look for changes that can be made in business procedures and administration to accommodate the package. Any modification to the system increases the difficulty of support and moves the firm away from the vendor's basic product.

Next, an organization should not make a purchase decision completely based on software capabilities but should give ample consideration to the vendor that will supply the product. A responsive and supportive vendor can overcome some system weaknesses and will, in the long run, make a micro software installation a success.

OUR PC SQL IS ABSOLUTELY ONE HUNDRED PERCENT TOTALLY IBM COMPATIBLE.

IT'S THE ONLY ONE THAT IS.

JUST ASK YOUR MAINFRAME.

YOUR MAINFRAME WILL PROVE IT.
Your IBM mainframe is the ultimate judge of micro products which claim to be SQL compatible. Now you can *prove* QINT/SQL compatibility and open up a whole new world of micro/mainframe possibilities for your SQL/DS or DB2 DBMS.

LINQ-UP FROM QINT.
LINQ-UP is the micro/mainframe link that sets the stage for fully realizing the enormous potential of SQL. And it's available *now!*

With QINT/SQL, LINQ-UP enables several users to readily exchange data with your mainframe. You'll reduce application backlogs up to 20 times faster while reducing overall mainframe costs.

TOTAL INTEGRATION.
Total Integration means the consistency that results when the latest information is available to everyone who should have it. It means the accuracy that results from its timely exchange. And it means the certainty you'll feel when faced with key decisions.

All this is possible and *more.*

With LINQ-UP, your mainframe can take full advantage of other QINT/SQL enhancements such as: DATACON, QINT's interface with Lotus 1-2-3® and other popular PC products; PICASSO, QINT's SQL screen painter and report writer; QMF for the PC—watch for our announcement.

THE ONLY HELP YOU'LL NEED.
If compatibility is critical to your decision about SQL micro/mainframe integration, send the coupon below or call QINT at (617) 891-3377.

You'll soon have all the proof you'll need.

® Lotus 1-2-3 is a registered trademark of Lotus Development Corp.
® SQL/DS and DB2 are registered trademarks of International Business Machines Corp.

QINT Database Systems Corporation

The compatibility company.

125 Roberts Road, Waltham, MA 02154 (617) 891-3377

Name _____ Title _____

Company _____ Street _____

City _____ State _____ Zip _____ Phone _____

Special Report

User contacts, other aids help shoppers pick software

There are three methods for obtaining the information necessary to compare microcomputer software packages to the requirements on an organization's checklist:

- Watching presentations and demonstrations.
- Contacting other users of a system.
- Reviewing a package's documentation.

Watching vendor presentations. Presentations are an excellent introduction to a system.

Major vendors are experts at marketing their products and will have a well-developed presentation prepared. Smaller vendors may be willing to demonstrate the system at a prospective customer's site or to send a demonstration package.

If an organization supplies a requirements checklist, the vendor will be able to address specific requirements and to direct its presentation toward those areas. Prospective buyers should bear in mind that caution is the key word at this stage — all systems look terrific in a presentation.

The organization's acquisition team should not accept a glossy, high-level presentation as being completely representative of a system but rather should ask specific questions and require the vendor to give detailed answers.

Contacting system users. The most reliable sources of information about a particular system are the individuals who use it, and the software acquisition team should contact as many users as possible, particularly those in the same industry.

Most vendors will furnish a complete listing of their clients, and prospective buyers should be wary of those that will not, especially those that insist on contacting their clients before the prospective buyer does.

These vendors may have made special arrangements to provide extra support or reduced prices to a group of users in exchange for recommendations.

Before an acquisition team speaks with other users, it should establish a set of direct questions about the operation of the system, the quality of the vendor and the usefulness of the documentation.

When the team actually contacts other users, it should note even casual references to problems. One user may have learned to live with problems that the prospective buyer would find unacceptable.

The acquisition project manager should ask the vendor to respond in writing to reported problems and should carefully evaluate the vendor's willingness to discuss and correct these problems.

The manner in which a vendor responds will indicate how it will respond when problems arise after a software package has been installed.

Reviewing documentation. Documentation is one of the most important and most overlooked areas of system evaluation. It is important because it serves as the primary source of information on using and understanding a system once it has been installed.

Prospective end users should review selected portions of a vendor's documentation and evaluate them for accuracy and readability. Documentation that cannot be understood cannot be used.

With microcomputer software, the rush to get a product on the market often results in little, if any, time for thorough documentation. A prospective buyer should not hesitate to point out problems to the vendor and to request that sections of the documentation be rewritten or clarified.

Documentation is a good yardstick for measuring a vendor's reliability. A vendor that has invested significant effort in the documentation of a system is likely to be a vendor that is concerned about ease of use and, in turn, about the user's satisfaction.

Novell introduces the best way to improve your network reception.



In a relatively short time, the local area network (LAN) market has attracted a host of suppliers. Each has a LAN system to sell. And each is fighting for a proverbial piece of the LAN pie.

Amid all those LAN contenders, only one company is out to make all LAN systems perform better. Only one company offers high-powered LAN operating system software that improves the performance of every major LAN system on the market. Only one company is finishing the job the other LAN makers begin.



The company is Novell. The company's solution is NetWare.

NetWare performs.

How good is NetWare? In recent benchmark tests conducted by Novell as well as Belmont Laboratories, NetWare significantly improved the performance of every LAN system tested.* In fact, NetWare currently runs on 24 different LAN hardware systems, outperforming the original software for every one.

Serving all LANkind.

Whichever LAN hardware you choose, NetWare is the LAN software designed to get the most out of your network. When it's time to improve the reception your network gets from those who use it every day, plug into NetWare. It's from Novell, the people dedicated to serving all LANkind.

For more information, call or write Novell, Inc. 1170 N. Industrial Park Drive Orem, Utah 84057 (801) 226-8202

*LAN Benchmark Report, May, 1985, Novell, Inc. and "Software, Not Hardware Key to LAN Performance," *PC Week* 1/15/85.

NOVELL

BREAKTHROUGH



THE ALTOS 3068. THE MOST ADVANCED SUPERMICRO FOR OEM'S.

What makes the thirty user 3068 a breakthrough for OEM's?

- *Best price/performance*
- *Most modular system*
- *Most advanced microprocessor*
- *First MC68020 based system*
- *Most advanced version of UNIX™ System V*
- *Most complete communications and networking*
- *First micro with remote diagnostics*

THE ALTOS 3068, SIX BREAKTHROUGHS IN ONE.

FILE PROCESSOR SUBSYSTEM

Controls 4 DMA channels for disk, tape, floppy, and parallel printer port; overlapped seeks on up to 3 disks.

CPU BOARD

32-bit MC68020 microprocessor running at 1.5 MIPS with no wait states; 8 Kb high speed cache memory; up to 16 MB virtual address space per program; optional floating point processor.

RAM BOARD

Can be configured to OEM needs, up to 16MB using 1MB, 2MB, & 4MB boards.



BREAKTHROUGH PRICE/PERFORMANCE

A clear leader in its price range — from $7,000 for OEM quantities — the 3068 combines the 32-bit MC68020, multiple auxiliary processors, and a tuned version of UNIX™ System V. Use it as a stand-alone or a network node.

BREAKTHROUGH MODULARITY

OEM's can select from a wide range of field installable modules and options to meet any reasonable price/performance requirement: 10 to 40 serial ports, 1 to 16 MB of memory, and from 17 to 200 MB (formatted) hard disk storage.

BREAKTHROUGH HARDWARE DESIGN

The CPU board's high speed 8 KB cache enables the CPU to operate at maximum speed with no wait states. Unique Multi-Context Caching™ hardware shares the cache between many processes simultaneously. Demand paged virtual memory is supported by high performance memory management hardware, and on-board microprocessors handle all I/O processing, leaving the CPU free for all applications.

SERIAL COMMUNICATION BOARD

8 MHz 8086 with 10 serial ports; 32 KB RAM on standard board supports Async. and LAN; 128 KB of additional RAM to support X.25, SNA or custom protocols.

STREAMING TAPE

60 MB, 90 IPS cartridge tape drive.

1.2 MB FLOPPY DISK DRIVE

HARD DISK

Expandable to over 200 MB (formatted) using up to three 17, 33, or 68 MB drives, each with their own power supply.

EXPANSION BOARD SLOTS

Up to three field installable boards can be added for more users or memory.

BREAKTHROUGH UNIX™ SUPPORT

To meet the most rigorous applications requirements, the 3068 incorporates demand paged virtual memory, record locking, and sophisticated interprocess communication. An optimizing C compiler, symbolic debugger, and a full set of development tools and languages form a complete development environment. Productivity tools include an integrated package of word processing, spreadsheet, DBM, graphics, and electronic mail.

UNIX is a trademark of Bell Labs

BREAKTHROUGH COMMUNICATIONS AND NETWORKING

With a variety of protocols and the Altos Worknet™ LAN, 3068 communications span PC's to mainframes. The standard communication board has 10 serial ports, an on-board micro-processor, and up to 128 KB of RAM. The system can be configured with up to four communications boards.

BREAKTHROUGH DIAGNOSTICS

Remote diagnostics minimize downtime by isolating problems to an easily exchanged Field Replaceable Unit.

Get a step ahead of your competition. Put our innovative supermicro engineering to work on your application.

In hardware, software, communications, service, and reliability, Altos has a breakthrough for you.

For more details on the 3068 please call:

1 (800) 538-7872

Inside California:

1 (800) 662-6265

ALTOS

COMPUTER SYSTEMS

WORLD LEADER IN MULTI-USER MICROSYSTEMS

Special Report

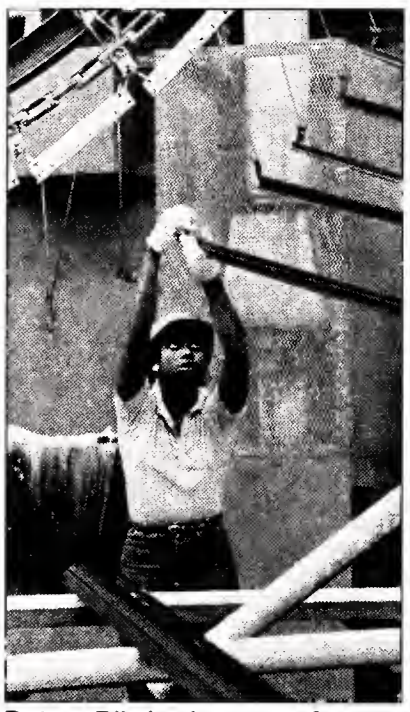
Aluminum parts firm finds time savers during stint

SMYRNA, Tenn. — A manufacturing firm here developed two time-saving applications in a CICS test environment while it served as a beta site for both a micro-mainframe communications software package and a mainframe program on which the link is based.

The user, Better Bilt Aluminum Products Co., ran beta tests with Cincom Systems, Inc. for the vendor's PC Contact micro-mainframe link and Mantis 4.0, a recent upgrade of Cincom's Mantis applications development software.

PC Contact works through Mantis 4.0 to give micro users access to on-line mainframe data.

Better Bilt, a subsidiary of Indal Ltd., manufactures a line of aluminum windows



Better Bilt is the manufacturer of a line of aluminum doors and windows.

and doors. The firm began beta testing the two products last September, running the mainframe software on its 5M-byte IBM 4361 and a copy of the link on an IBM Personal Computer XT. The company's mainframe runs CICS and DOS/VSE under VM.

Glitches found

According to Jeff Borsini, Better Bilt's information center manager, the beta tests pointed out some glitches — most of which were problems with Mantis 4.0 that the vendor fixed with mainframe code patches — but proved in general that the link would meet the manufacturer's needs.

Borsini said PC Contact provided "a way of formatting and transferring mainframe data to a [personal computer], while being transparent to the user."

During the beta test, Better Bilt's MIS staff loaded some production data into a test CICS environment and programmed the link to perform two tasks.

In one application, the link software gave end users the ability to transfer information from intelligent time clocks through the Personal Computer XT to the mainframe. In the other application, the link provided console operators on the firm's 4361 with information about the status of an operation that ran on the XT.

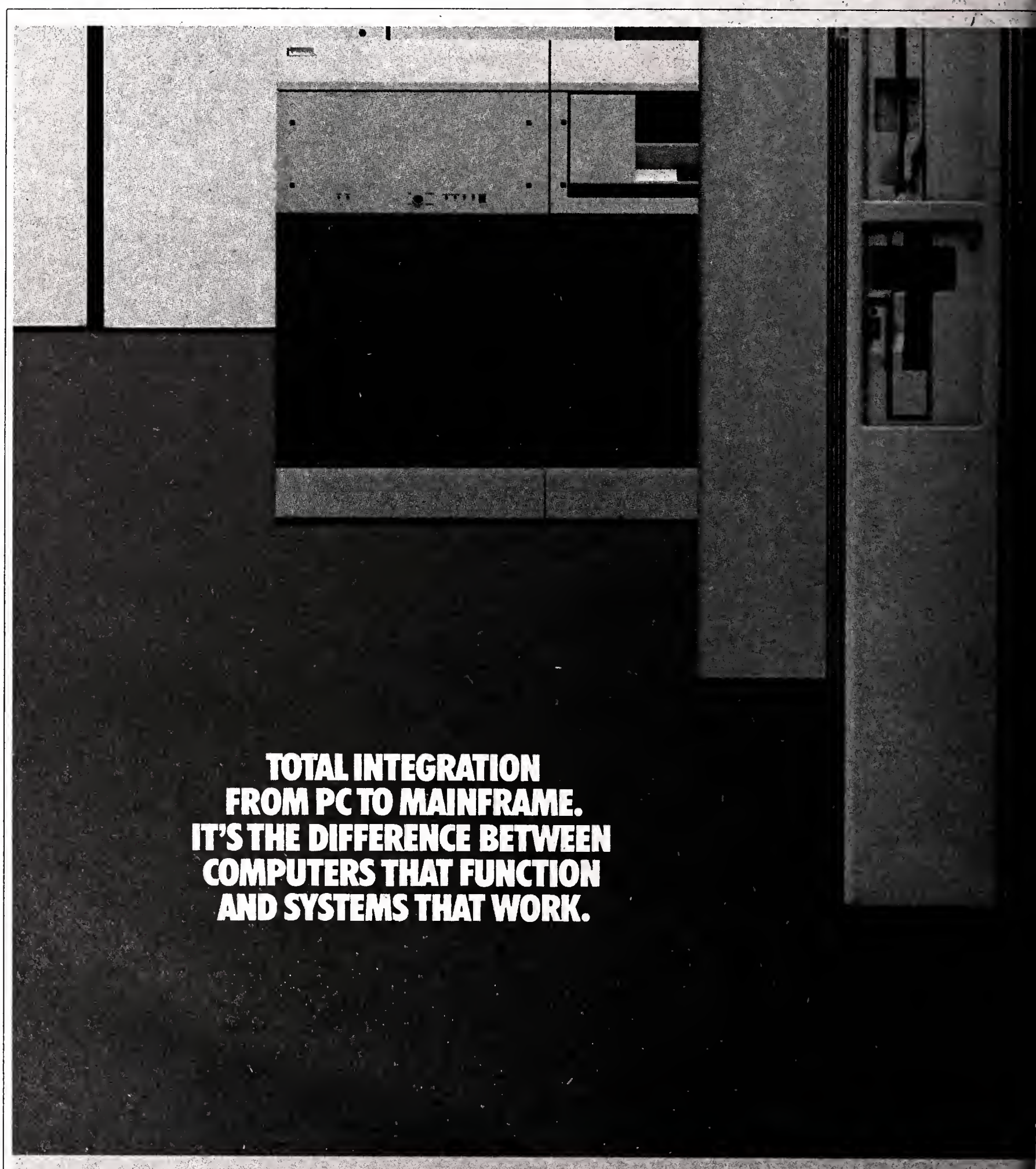
Time clock data transfer. For this application, Better Bilt loaded a copy of its on-line payroll system into the test CICS environment. Borsini and his staff then programmed PC Contact to call Mantis programs that read data from a file on the Personal Computer XT and wrote it to an on-line mainframe file.

With the link in place, end users call a PC Contact menu option and the software invokes all the data transfer steps.

The system transfers data from between 600 and 700 time cards to the mainframe in about six minutes, according to Borsini. Without the micro-mainframe link, the task took between three and four hours.

Micro status report. For this application, Borsini used a feature of the link that allows users to play back a series of keystrokes programmed into the software. With the keystroke-saving feature, he programmed a series of messages that the Personal Computer XT sends to the mainframe console.

The messages tell the console operator the status of a



In the time it takes to read this sentence, another Sperry computer system will go on-line. Joining what is already the world's largest installed systems base—save one. $17 billion worth of conviction that Sperry, *the systems integrator*, is the right choice.

What do customers see in Sperry?

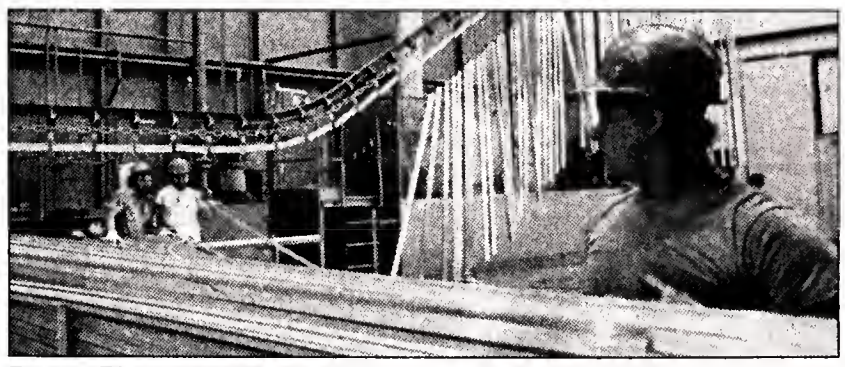
Investment protection. Of the sort that lets a Series 1100 mainframe computer buyer increase his system's power 23 times. On a single operating system. Without a single software rewrite.

Compatibility. So Sperry systems talk to IBM® and IBM-compatible hardware. And Sperry offers a complete PC to mainframe line based on the industry-standard UNIX™ Operating System, with hundreds of available off-the-shelf programs for everything from office automation to shop floor control.

Systems Integration. With a wide range of interconnectable

Special Report

as test site for link package



Better Bilt employees load aluminum strips for painting.

daily electronic check reconciliation procedure that Better Bilt uses to transfer information between its headquarters and Pittsburgh's Mellon Bank. Every day at 7:20 a.m., the Personal Computer XT automatically dials into a mainframe at Mellon to transfer check reconciliation data.

If the line is busy or the mainframe is unable to accept data, the link software plays back a series of preset keystrokes that sends a message about the problem to the console operator. The messages tell the operator, for example, that the line was busy and the micro will try to dial again later or that the modem on the Personal Computer XT needs to be turned on before the data transfer can begin.

Borsini said the setup lets the firm run the check reconciliation procedure without keeping an operator at the Personal Computer to check for problems.

For the two applications, Borsini and his staff programmed the link software so that operations would be transparent to users. For the time clock data transfer, for example, information center staff members had to create command strings in PC Contact so the link would invoke Mantis read and write formats.

Users, however, see the application as a simple procedure: They call for one menu option, and the transfer from the micro to the mainframe takes place.

Once users invoke PC Contact, Borsini said, they just "sit and watch it go." Because the link software relies on Mantis to access data, programmers at Better Bilt have found it easy to use, he said. "If you know Mantis, there's very little to learn."

Borsini added, however, that he finds both Mantis and PC Contact too difficult for end users to program. For future applications, Better Bilt will follow the same procedure it did for the two test applications: Programmers will develop software and give users an easy interface to the system.

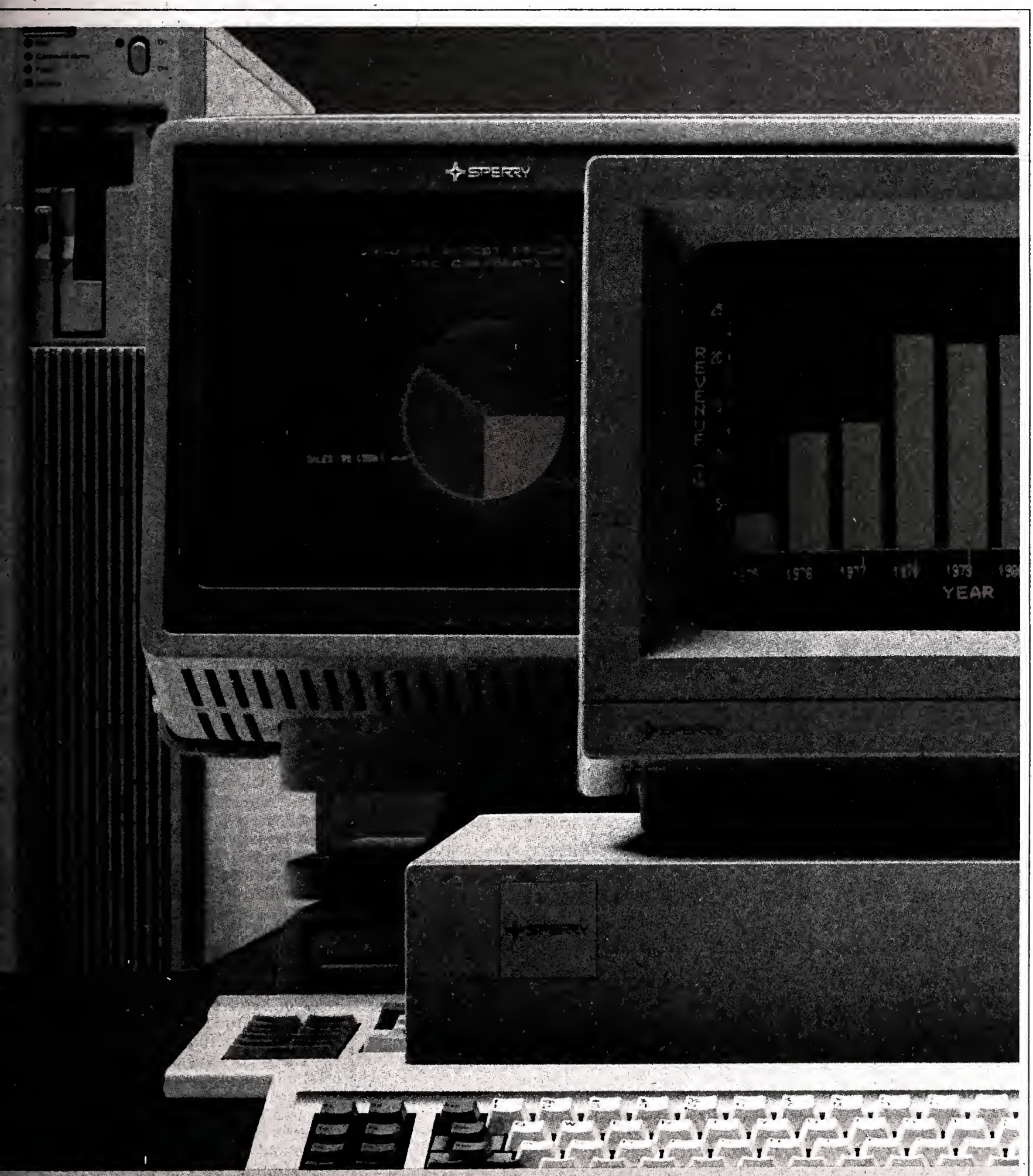
> *'The idea is to eliminate the technical part so the [micro] user can deal in an environment that he understands.'*
>
> **— Jeff Borsini**
> **Better Bilt**
> **Aluminum Products Co.**

"The idea," he said, "is to eliminate the technical part of accessing the mainframe so that the [micro] user can deal in an environment that he understands."

Better Bilt has just received its production version of Mantis 4.0 and plans to expand its PC Contact applications soon. With the beta test version of the software running in a CICS test environment, Borsini said, "We cannot get to any of our [live] data." The firm expects to initiate an executive inquiry system as its first micro-mainframe link application, he said.

Seven of the nine Personal Computer ATs and XTs the firm owns are fitted with terminal emulation boards, making them candidates for connection to mainframe via the link.

Cincom officially released Mantis 4.0 in January; PC Contact became available for users outside of test sites on April 19.



information systems products for data entry, single or multi-user personal computing, integrated office automation, data communications and database management.

Research & Development. On projects for mainframe-to-mainframe communication, artificial intelligence, voice recognition systems and desktop mainframes.

Sperry. We're not just anticipating the future of computer technology. We're creating it.

For further information on Sperry products, or to arrange a demonstration at a Sperry Productivity Center nearest you, write: Sperry Corporation, P.O. Box 500, Blue Bell, PA 19424-0024. Or telephone 1-800-547-8362.

©Sperry Corporation 1985
IBM is a registered trademark of International Business Machines Corporation
UNIX is a trademark of AT&T, Bell Laboratories.

SPERRY

Special Report

Touch-screen input emerges from specialty markets,

By James Logan
and Dan Schlieben
Special to CW‡

Touch-screen input to microcomputers, which has gained some popularity in a number of vertical markets, is coming into more general use as a facet of video-based training programs in large corporations.

The technology has found comfortable niches in process control, where touch screens reduce the size and complexity of control panels; in point-of-sale settings, where they provide shoppers with a way to browse through video catalogs and shop via computer terminals; and in restaurants, where touch screens have already replaced membrane overlays on cash registers.

Now, in large corporations, the touch screen is being wedded to another technology, the interactive videodisk, to offer a new generation of training systems. Innovative managers are developing interactive videodisk-based courses to replace traditional centralized classroom instruction. These systems offer managers the ability to set up geographically dispersed learning centers where self-paced instruction is delivered via easy-to-use, interactive touch-screen monitors.

Interactive videodisk training systems are being employed in a wide range of settings. In the executive suite, they are training managers by modeling and acting out business situations that require critical decision-making skills. In hazardous shop environments, they are teaching workers safety procedures through video simulation. Auto manufacturers are using interactive videodisk systems throughout their dealership networks to deliver up-to-date training for mechanics and salesmen.

Touch screens are becoming a standard input feature in such videodisk-based training programs, and there are three reasons for this:

- They substantially reduce the time it takes users to learn to interact with the training system.
- They reduce or eliminate keyboard usage, thereby helping focus students' concentration on course content rather than on how to communicate with the system.
- They offer a more direct and intuitive way of interacting with visual information than keyboards do.

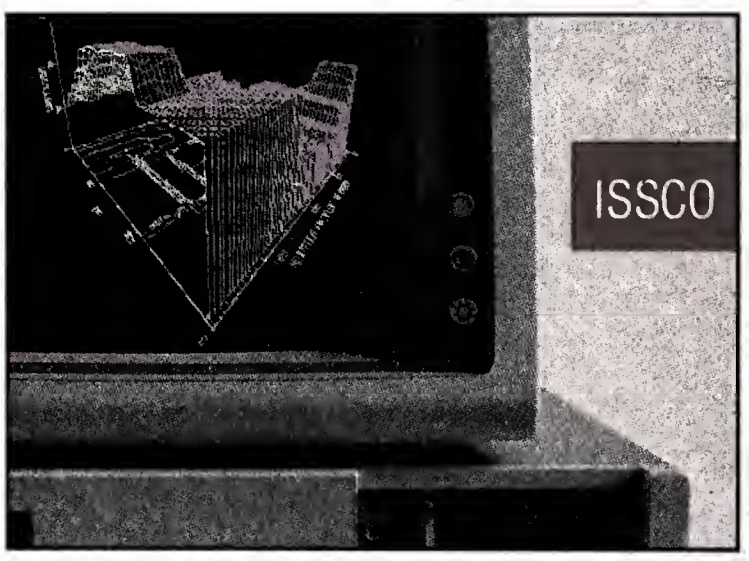
Controlled studies have been performed to test the efficacy of touch-screen videodisk systems. One study, done at the University of West Florida, pitted touch-screen videodisk training programs against manual ones in an effort to teach Florida Department of Health employees to administer a social program. Employees who received conventional instruction learned the task in 160 hours; those who used the video-based system learned in 120 hours, or in 25%

See what EnerConnect can do with mainframe graphics on your PC.









EnerConnect™© is the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC/XT/AT or 3270 PC.

Now a PC user can have desktop access to business and technical graphics applications generated by GDDM, ISSCO's Tell-A-Graf® and DISSPLA,® SAS/GRAPH® and IGES datafiles.

Once they're displayed, EnerConnect lets you manipulate them in a variety of ways. You can rotate, enlarge, reduce, cut-and-paste with other elements from different mainframe files, add text and even direct output on low-cost PC printers and plotters. All without using expensive mainframe connect and processing time.

You can also use our PC-based graphics program, EnerGraphics, to interface with spreadsheet data from LOTUS 1-2-3, VISICALC and other packages, turn the data into easy-to-understand bar charts and then combine them with mainframe graphics.

EnerConnect. Your Mainframe-to-PC software link. Developed by the specialists in graphics applications software.

Call or write for our free brochure and see what EnerConnect can do for you.

ENERTRONICS SEEING IS BELIEVING

Enertronics Research, Inc. • 150 N. Meramec • Suite 207 • St. Louis, MO 63105 • (314) 725-5566 • 1-800-325-0174

Piecing together a training station

By James Gokhale
and James Logan
Special to CW‡

The basic building blocks of an interactive videodisk-based learning station are the microcomputer, the touch-screen monitor, the videodisk player and the software.

The micro. The main engine of the workstation is usually a general-purpose microcomputer. It may contain 64K to 2M bytes of memory, depending on the kinds of peripheral devices that will be attached to it and the system environment that will exist to support software development.

For practical reasons, these systems usually come packaged with disk storage subsystems that start at 10M bytes. At least one form of diskette drive for removable media is also standard. System support for displays, monitors, printers and I/O devices are usually packaged as options.

The touch-screen monitor. Touch-screen monitors generally use one of three technologies:

- Infrared.
- Resistive.
- Capacitive.

Vendors of all three currently offer similar pricing options.

The videodisk player. Optical storage technology has made the videodisk a practical storage medium for large amounts of visual and audio information. The disks come in a limited number of sizes and formats, so compatibility among disk players and disks is rarely a problem.

The predominant medium used in training applications is the 12-in. disk with a constant angular velocity format. A 12-in. disk has 54,000 concentric tracks (or frames) on each side, and each track can hold video information for one National Television Standard Code (NTSC) full screen image. At a normal playing speed of 30 frame/sec., this storage capability represents one-half hour of motion video per disk side.

Depending on the application, the disk side may consist entirely of

Gokhale is vice-president of software development at Telematic Systems, and Logan is president of Microtouch Systems, Inc.

Special Report

enters mainstream as aid for video-based training

less time than their coworkers.

The previous generation of computer training systems did little more than emulate manual environments: They substituted the process of striking the Return key for that of turning the page. The current generation of videodisk-based systems, however, offers an array of capabilities (audio, still frame, motion video and computer-generated graphics, for example) to the learning environment.

These capabilities allow the system to simulate realistically anything from sales situations to assembly line operations. Course designers can create varying levels of dynamic feedback through audio and video effects and can set up a training program that closely monitors student actions. If a training application is well designed, it allows students to control the pace, direction, depth and style of their instruction.

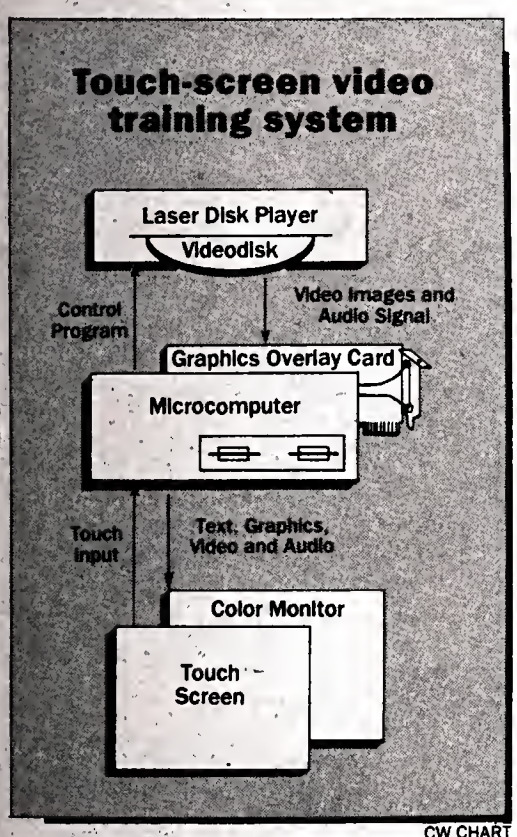
Microcomputer-based video learning stations allow training to be scheduled in a flexible manner with respect to time and geography. The result can be significant reductions in the costs associated with travel and with the time that employees spend away from the office.

In addition, videodisk training allows companies to get leverage from the expertise of their instructors. In many disciplines, the supply of qualified instructors has not kept pace with demand, and this is particularly true in technical fields. The ability to capture expertise on a videodisk and in software for distribution throughout a company can yield tangible savings for strained corporate training budgets.

Most large companies have several areas where touch-screen videodisk systems can be used for training. The most cost-effective applications will involve a repetitive task and will affect a large number of employees. In a manufacturing setting, such applications might be training programs for machine maintenance, process control or work assignments. In a service environment, video-based training might teach workers new procedures and methods or might explain personnel policies.

As corporations are faced with a competitive business climate in which rapidly changing technologies may make skills of the labor pool in certain industries obsolete, the need to retrain workers will be critical. By all indications, interactive videodisk training systems will play a major role in meeting this need.

Logan is president of Microtouch Systems, Inc. in Woburn, Mass., a firm that develops touch-screen technology. Schlieben is sales manager for Telematic Systems in Cambridge, Mass., which specializes in videodisk systems.



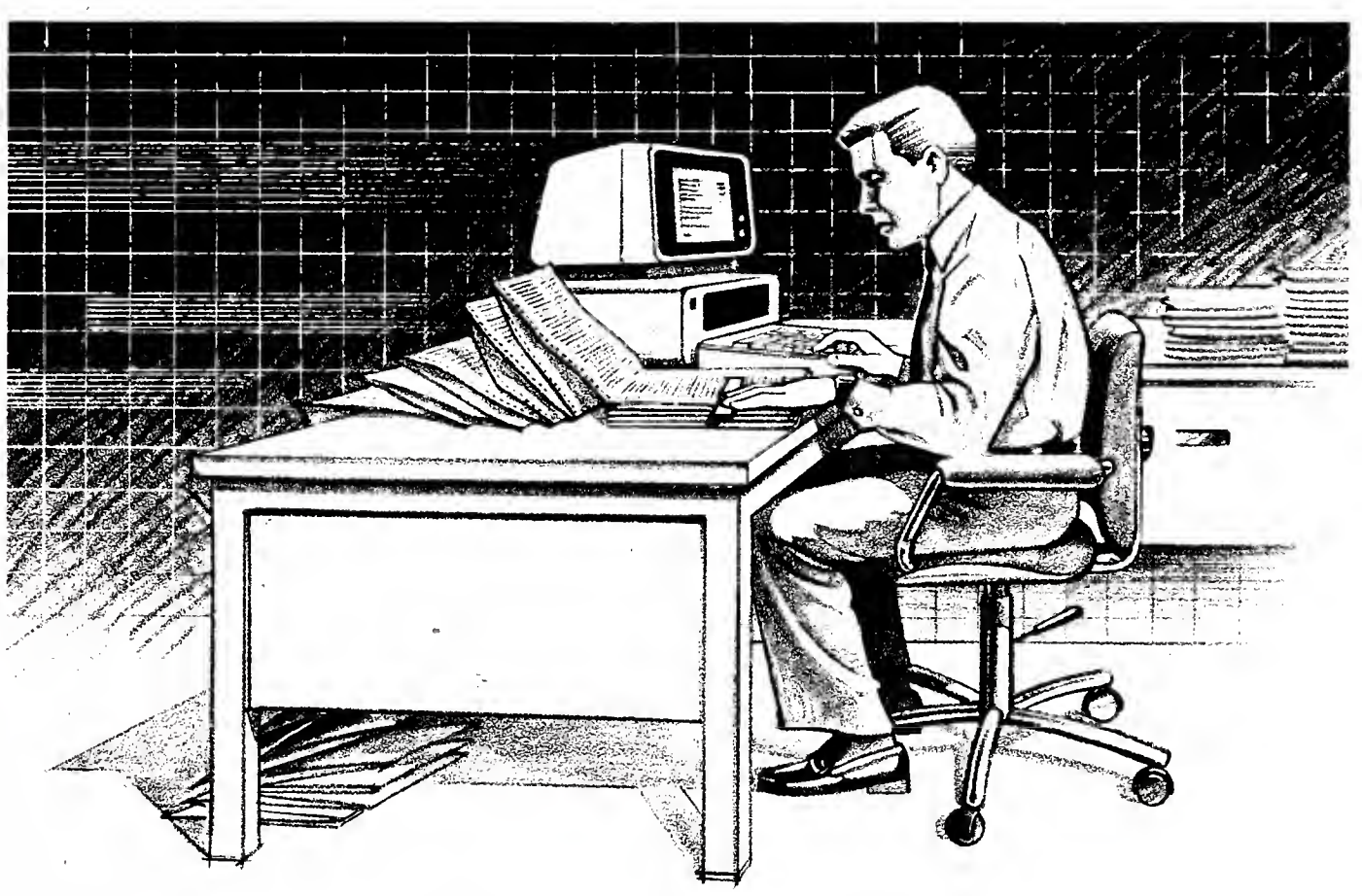
The building blocks of a touch-screen video training station.

motion-video sequences, a combination of motion-video and single-frame images or all single-frame images. Videodisks also support two channels of audio information the disk player can access independently.

The software. The microcomputer controls the videodisk player by sending software instructions. These instructions may start or stop the player, find a particular frame on the disk, display a frame or series of frames or manipulate either of the two audio channels.

Some advanced applications require the ability to overlay computer graphics and text on the video image. This capability is usually implemented as a board-level add-on to the microcomputer. The add-on boards accept input from the videodisk player (an NTSC television signal) and convert the signal to red-green-blue (RGB) components before sending it to the video monitor. This way, graphics and text are synchronized for output with RGB signals. Systems developers must have appropriate software to make use of this advanced capability.

The software development environment required to produce the control program for these systems is referred to as the authoring system or the language. It is usually hardware-dependent, and different packages offer varying levels of instructional features, touch-screen support, videodisk player support and graphics.



THE $43,000 DATA-ENTRY CLERK

Take a bright individual, put him through MBA school, give him a $7,000 computer system, a spreadsheet program and an important project for the company, and then ask him to spend a few days punching numbers into the PC from a printout. Doesn't seem like a good idea, yet this scene is echoed throughout your company.

Micro Tempus offers Tempus-Link, the micro to mainframe software connection that will transfer, store, distribute your corporate data.

TEMPUS-LINK

For people who USE computers

MICRO TEMPUS INC. 440 Dorchester Blvd. West, Suite 300, Montreal, (Qc) H2Z 1V7 Canada
Phone: 514-397-9512 • Telex: 055-61829 • U.S.: (800) 361-4983

MICRO TEMPUS INC.

Special Report

Info centers focusing on user experience, concerns,

By Naomi Karten
Special to CW‡

Conceptually, the information center's training function seems simple: Put users through a course or two in a package or two and set them loose to raise their productivity through the roof. Then sit back and be available to lend a hand when questions arise.

The reality, however, is that probably no facet of user support has information centers as overwhelmed as user training. The sheer number of people banging down the door for training exceeds the capacities of many companies.

In the DP world — so the complaint goes — there is never time to do it right but always time to do it over. In user training, however, there is no time to do it over. Yet because so many trained users subsequently need refresher training — and repeat refresher training in some cases — it seems appropriate to question the effectiveness of their first go-around.

One possibility is that training products and services are selected based on an assessment of their relative merits, to the near absence of attention to the needs and preferences of the users to be trained. But as training backlogs grow, recognition of individual differences in learning may become the key to the success of the micro support function.

Users are as different from each other as they are from DP. Certain users in certain business environments learn more effectively from one form of training than other users in other business environments in the same company.

Information centers are generally familiar with the gamut of training alternatives. Users are not. Simply put, users may not know much about computer training, but they know what they like.

Unswayed by vendor or trainer perceptions, these users have their own preferences. Some want and need to pace their own training; they function poorly in the midst of classroom-generated peer pressures and cannot sustain an attention level high enough to see them through two full days of training. Others take well to both the discipline and the camaraderie of the classroom and much prefer the personalized nature of human interactive training.

It is beneficial, therefore, to consider user concerns in terms of learning styles, business priorities and scheduling preferences and the possibility of offering a choice of training techniques. An analysis of training effectiveness in both large and small companies reveals five categories of issues that are useful in evaluating the effectiveness of alternative training methods relative to user needs. In each case, it is clear that some users benefit more with one type of training — whether computer based, classroom/workshop or one on one — than others.

■ **Variations in user mindset: the attitude issue.** Users are rapidly moving past the computerphobia stage. But some are still in the "Are you sure it won't bite?" category and need more hand-holding and sensitive, continuously available support than do the closet "techies." Alternatively, in companies that do not have a top-down approach to personal computer training, managers often prefer to lock themselves privately in their offices with their micro tutorials and learn away from the watchful eyes of computer-proficient subordinates.

■ **Level of user commitment: the motivation issue.** This has two meanings. One distinguishes between users



Karten, a former information center manager, is president of Karten Associates, a Randolph, Mass., consulting firm active in computer literacy training and the implementation of corporate personal computing.

Special Report

preferences can provide the most effective training

who have legitimate work-related reasons for learning personal computing and those for whom training provides a convenient opportunity for on-the-job career enhancement. (This is a valid distinction. Users are no different from programmers in occasionally looking forward to training as just such an opportunity.) A large financial investment in classroom training may be easier to cost-justify for personnel with immediate and documentable training needs.

The second meaning of commitment takes into account the priority nature of business life. Are users willing and able to make a commitment to complete a three-day, in-house class without work-related interruptions? Should classes be held off site so that users prone to interruptions and distractions would have a better chance of concentrating on the material at hand? Will self-paced, behind-closed-doors training improve the probability of completing a training program or will it add to the "I'll get to it later" syndrome?

■ **Opportunities to put new skills to immediate use: the scheduling issue.** Micro managers need to take a hard look at this one. Many users are concerned about the pressures and "learn it now or forever hold your peace" feeling imposed by an intensive, multiday class. Unless a user has a specific responsibility to implement what he has learned, some of the training material will not be absorbed. Much of the rest will be forgotten. Follow-up interviews a month or more after training often show that more than half the class participants had not yet used the skills that they had learned.

When training backlogs are long and growing, perhaps certain classes should be reserved for those with designated personal computing responsibilities, and other classes should concentrate on computer-based training. Or classroom training con-

> *Users are rapidly moving past the computer-phobia stage. But some are still in the 'Are you sure it won't bite?' category.*

ducted a few hours twice a week rather than all at once may be worth seeking out.

■ **Customized vs. general training: the relevance issue.** How important is it to address company-specific business needs? The popularity of off-the-shelf micro-based tutorials may suggest that users are willing to forego relevance in the learning process. Or it may indicate that the customization offered by some vendors or designed by in-house staff is available only at what is perceived to be too great a cost. Many users resist the packaged (Lotus Development Corp.'s 1-2-3) approach of some training vendors. Given the cost of lost learning, the expense of customized training can be worth the investment.

■ **Training effectiveness: the quality issue.** Training effectiveness is a function of the quality of the training. Classroom training that is not a blend of business, technical and teaching expertise may do users a disservice. Similarly, if a micro-based tutorial's explanations are more confusing than the problems they are intended to solve, the user would be better off to read a book.

Information centers that invest the time to solicit and examine user preferences and to plan two or three different training paths to personal computer competence may be rewarded with a greater level of user satisfaction and skill and — who knows — maybe even a reduced rate of return!



Special Report

File server, micro software merge to give investment

BOSTON — When end users at an investment firm here initiated a search for a micro-mainframe link, the MIS department joined in to ensure that the link was consistent with the firm's mainframe environment and that it provided for controlled access to data.

Users at Fidelity Investments Co. wanted a way to use mainframe data on their microcomputers in conjunction with software packages like Lotus Development Corp.'s 1-2-3.

"[They] were using powerful data, but in many cases they had to rekey it from a batch report back into a [personal computer], which can take several hours a day," said Frank Diasparra, vice-president of the firm's systems engineering group. "They'd say, 'You could get a lot more out of me if I could simply get the information I need from the main computer.' "

> *The firm wanted to use a central file server to give its various machines access to data from all other machines.*

The firm had about 350 microcomputers — IBM Personal Computers, Personal Computer XTs and compatible machines — and maintained its data on four IBM mainframes: two 32M-byte 3083 Model JXs, a 12M-byte 3033 and a 16M-byte 4381. The two 3083 JXs maintained production data bases under MVS/XA. Subsets of the production data resided on the 3033 under VM/SP, and the 4381 under VM, where they were available for user access. About 1,800 dumb terminals tapped into the data on the VM machines.

Diasparra said pulling together the various parts of a sprawling system was a goal his company shared with other firms. "Many, many organizations have the same problem. They need the ability to get data to and from the various parts of their computing environment," Diasparra said.

Fidelity, however, wanted more than a link between machines. When the firm began its search for a micro-mainframe link, it had a number of criteria for the product. The link would have to provide the following:

■ **Generic communications abilities.** Fidelity's users had recommended some links that tied particular mainframe software packages to particular micro products. "Every one had merit," Diasparra said, "but they were too specific. They were add-ons to somebody else's product line that tied the user to a particular data extraction capability on the host side, a certain set of tools on the [personal computer] side or a particular communications protocol."

Fidelity wanted generic capabilities so it could link new products as the firm acquired them.

■ **Peer-to-peer linkage.** Diasparra said Fidelity wanted to use a central file server to give its various machines access to data from all other machines, with each appearing to any other as the same kind of machine.

The firm also wanted to translate data from one format to another rather than merely to transfer it among machines, according to Alex Niehaus, a technical adviser in the systems group. "We wanted the ability to move from [VM to a personal computer environment] and translate the data to [personal computer] products such as Lotus' 1-2-3," he said.

■ **Data integrity and security.** Fidelity maintained a VM environment on its mainframes because VM offered strong control over users' access to information and allowed for automatic data backup. Diasparra said the firm wanted a link that was consistent with these features and that would not in-



Special Report

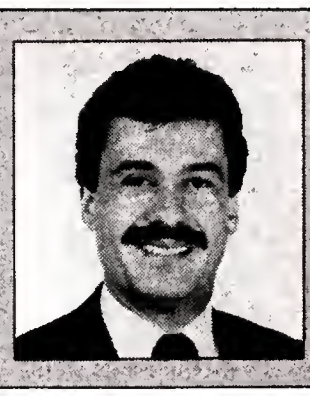
firm universal access

validate them.

Last fall, the firm purchased Linkware Corp.'s Linkware:Information Server, a product that combines a VM/CMS-resident file server application with corresponding personal computer software. It installed the mainframe software on both of its VM machines and gave about 25 personal computer users copies of the micro software.

The personal computers are linked with the mainframes via coaxial cable. Each micro has a terminal emulation board that allows it to appear to the mainframes as a 3270-type machine. Diasparra's group maintains control over access to mainframe data through the file server's user identification scheme, which allows MIS to allow or deny access to individuals or to classes of system users.

> *'We go to the data source . . . [and] download the data . . . transformed into an executable format. The situation is completely reversible for uploading.'*
>
> — Frank Diasparra, Fidelity Investments Co.



To obtain data from the mainframe, a user types a Linkware command on his personal computer; the software produces a menu displaying options. The user then looks through directories of mainframe libraries he has access to and instructs the software to translate data he wants into a format his micro software can use, such as Data Interchange Format and Lotus' Print format. He then downloads the data to his micro and manipulates it.

Diasparra said Linkware supports VM access methods and that this, in conjunction with the microcomputer file formats the product supports, gives Fidelity Investments the generic capabilities it needs. "With Linkware, we go to the data source, log on, see the data we are authorized for [and] download the data into the [personal computer] transformed into an executable format," Diasparra said. "The situation is completely reversible for uploading data."

When the user is finished, he can store updated files in one of two mainframe libraries — a personal library only he has access to or a central library, from which other authorized users can access the data. When a file is stored on the mainframe, it is automatically saved by VM's backup facilities.

User profile

Most of Fidelity Investment's 25 current users of the micro-mainframe link are financial analysts, secretaries and managers. They manipulate mainframe data on their personal computers with Lotus' 1-2-3 and Symphony, Ashton-Tate's Dbase III, Microrim, Inc.'s Rbase and other micro software packages.

The financial staff members analyze stock market trends, customer information and financial data; the secretaries do budgeting, list-tracking and shareholder tracking; managers use their personal computers for decision support. Staff members in the firm's controllers office also use the micro-mainframe link for a variety of tasks.

Diasparra said that in the future, about one half of Fidelity Investment's microcomputers will be tied in to the VM mainframes, and all these machines will use Linkware. The other half will serve as stand-alone machines.

CA-UNIVERSE™ AND CA-EXECUTIVE™
LINKING THE NEWEST TECHNOLOGIES IS THE SIMPLE, POWERFUL, TOTAL SOLUTION THAT CONVERTS YOUR DATA CENTER INTO AN INFORMATION CENTER.

CA-UNIVERSE and CA-EXECUTIVE represent the latest advances in their fields of information processing. CA-UNIVERSE is a true relational DBMS, much more comprehensive than either SQL or DB II, that gives programmers the application independence they've needed. CA-EXECUTIVE is the industry's most versatile and powerfully integrated micro workstation software with a secure, intelligent link to the mainframe. Both give end users the easy access and multiple facilities they've always wanted.

Companies are discovering that when they combine these two products they get both an information management solution and an applications development solution. Instead of a backlogged data center, you get a smooth-running Information Center, in less time and for less money than you ever thought possible.

This integrated total approach is by far the most cost-effective Information Center solution—at less than half the cost of doing it with fragmented "building block" type products. And it's better, too. For example, programmers can develop programs at both the PC and mainframe levels. And instead of a multitude of different query, reporting, data manipulation, and data base design languages, there is a single, unified English language common to both products. The entire system is portable across IBM DOS, MVS and VM environments. Leave the past behind. Start your Information Center by calling us at 800-645-3003, or (in NY) 516-333-6700 and ask for Dana Williams.

COMPUTER ASSOCIATES
Software Leadership Through Excellence

© 1985 Computer Associates International, Inc.
125 Jericho Turnpike, Jericho, NY 11753

Special Report

Good user-MIS relations spur successful acquisitions

By Joseph J. Adamsky and Mary V. Campbell
Special to CW‡

After years of computer use, large corporations have established procedures and planning cycles for developing and managing automation. Microcomputer acquisition, however, has circumvented these controls.

Users bypass the coordinated support that is available from their information systems departments. Their reasons for avoiding involvement with MIS vary. Some say past experience has convinced them that DP would seek total control over their procedures; others like the idea of determining their own expenditures and scheduling their own applications development.

Regardless of the reason, users who set out on their own encounter problems. They find, for example, that they have failed to arrange appropriate maintenance contracts or that they cannot train themselves to use their equipment properly.

Such problems diminish the benefits of the microcomputer, and many corporate users never realize the potential that this tool offers for their businesses.

MIS departments in many corporations have exacerbated the problems by avoiding involvement in microcomputer acquisition and support. Whatever the reasons for MIS' inaction — the feeling that micros are merely toys, the lack of time and other resources to back micro acquisition, the power struggles between DP and user departments — the result is that users have been forced to proceed completely without support.

> *Corporations that stress partnership between users and MIS will both minimize problems and maximize the benefits of microcomputers.*

In some companies, MIS has established control of acquisitions without providing any further support for users. This partial solution almost ensures failure. A total solution, on the other hand, involves both acquisition control and user support.

A planned partnership approach between user departments and MIS can bring about such a solution. This approach requires that neither party be dominant. Rather, in order to develop a strategy that best serves the corporate interest, each side provides expertise in its areas of strength: MIS offers its technical knowledge and experience; users outline their business needs, requirements and experience.

Such an approach requires the support and involvement of upper management. Upper management involvement does not ensure success, but its absence may result in failure.

Any firm that decides to take a partnership approach to microcomputer acquisition and support should first develop a plan of action. The plan will delineate roles so that the acquisition team can utilize different participants' expertise to achieve optimal benefits in a cost-efficient manner that is consistent with corporate goals.

The plan should include the following steps:

■ **Organize a committee.** The committee should include user and MIS representatives. To be truly effective, it should have clearly stated responsibilities for purchase review, standards, common package approval, security and the like. The committee should be vested with appropriate authority to support these responsibilities. The membership should include representatives of both user and MIS interests, but the committee should be kept to a small size.

■ **Appoint a coordinator.** Ideally, the coordinator of the joint effort should be from a user department.

■ **Consider a pilot effort.** Before a firm makes a major purchase of hardware and software, it can run a pilot program in one selected user department. This pilot will validate the exact configuration of hardware and software packages that will be required. It will also help the acquisition group develop security, procedural and processing specifications.

■ **Identify high potentials.** The acquisition group should identify users who have the motivation and interest to enhance the chances of a successful first effort. It should also point out applications that do not have a great number of interrelationships with other systems.

■ **Bring in outside experts.** "Outside," in this case, means experts who have no connections to vendors. A firm should hire such consultants to conduct seminars or short training programs.

■ **Centralize purchasing.** Centralized purchasing provides both leverage and quantity discounts for hardware, software, maintenance and service.

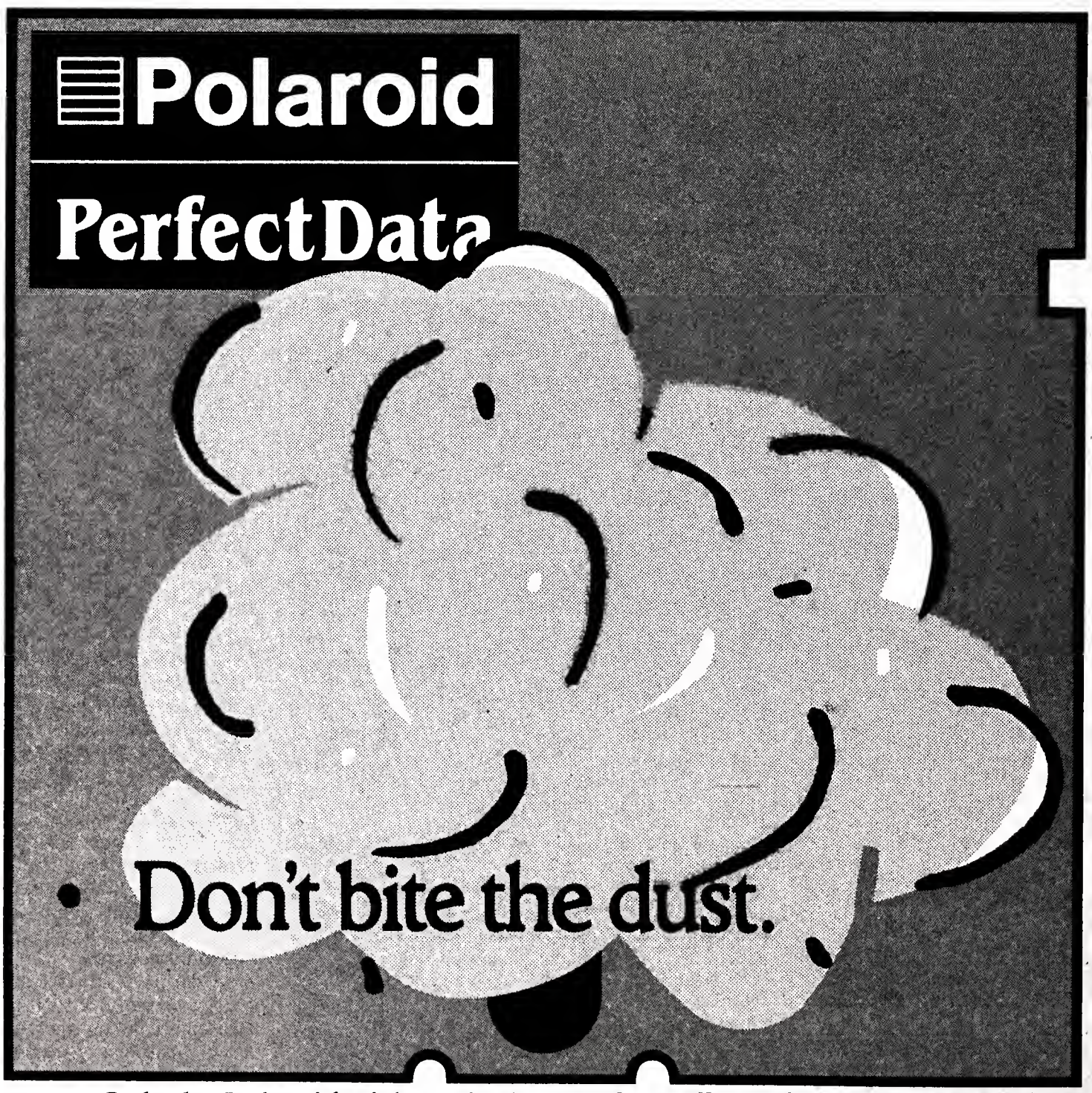
■ **Buy the software.** A firm should purchase software first, then buy the hardware that supports it.

■ **Establish policy and controls.** In order to minimize potential problems and maximize benefits, a firm must establish security and purchase controls and develop microcomputing policies. Controls should not, however, constrain users and MIS staff members.

■ **Determine training needs.** A wide variety of training methods will be needed initially and on an ongoing basis. Options include formal group sessions, tutorials, individual instruction and books and manuals. Some will require outside assistance; experienced MIS or user staff members can conduct others.

With a plan in place that addresses these points, a firm can move toward microcomputer acquisition and support. Corporations that stress partnership between users and MIS will both minimize the problems that develop when user departments proceed alone and maximize the benefits of microcomputers.

Adamsky is an associate professor of computer science at Grand Valley State College in Allendale, Mich., and a principal at Creative Computer Solutions, a consulting firm in Grand Rapids, Mich. Campbell is president of Micro Solutions, a consulting firm based in Baltimore.



Only the Polaroid Diskette in the gray box offers a free data recovery service. So, if you get it a little dusty, we can recover your data. (And most other accidents, too.) Call 800-241-4403. Because accidents happen.

© 1985 Polaroid Corp. "Polaroid"® of Polaroid Corp. "PerfectData"™ of PerfectData Corp.

Special Report

Low-cost multiuser systems may usurp role of local nets

By Charles Grant
Special to CW‡

IBM's recent introduction of the Personal Computer AT has generated attention for both multiuser systems and stand-alone micros connected by local-area networks. No doubt, customers who had not considered multiuser systems will be asking about them. And while few vendors welcome head-to-head competition with IBM, there are examples of well-engineered, value-added products successfully competing with Big Blue.

Besides the attention that comes with IBM's "validation" of the multiuser approach, IBM's introduction of a local-area network with an operating system that supports record locking means major software vendors will be more willing to develop true multiuser applications.

Multiuser systems usually support fewer workstations than local-area networks; 12 is a typical upper limit. Systems of this size support smaller businesses and the departmental organization of larger businesses within which communication primarily occurs.

> *Multiuser systems will replace stand-alone personal computers as the OA unit.*

This suggests a scenario for future cooperation between the two approaches. Multiuser systems, with their resemblance to the departmental organization of businesses, will replace stand-alone personal computers as the office automation unit. Local-area networks and stand-alone personal computers will play an important role in providing company-wide and interdepartmental communications.

There are two main types of multiuser systems — time-shared and multiprocessor. The multiprocessor approach more closely parallels the local-area network because each workstation has a dedicated processor.

Workstations in a multiuser system usually consist of a keyboard and a VDT cabled to a CPU. Each workstation has a dedicated processor plugged into the system bus located in the CPU. The microprocessors communicate with the system's dedicated file server and each other via the bus, rather than cabling, which is why multiuser systems are also referred to as closely coupled networks.

Both local-area networks and multiuser systems address the need for microcomputers that support the sharing of information and equipment. Cost and performance differences result from the fact that local-area nets attempt to extend multiuser capabilities to microcomputers intended for stand-alone use, while these capabilities are designed into multiuser systems.

The multiuser system's architecture delivers significant cost and performance advantages. Because multiuser workstations do not require individual power supplies and supporting hardware for each workstation, these systems are usually much less expensive than local-area networks. Networking circuit boards, the personal computer housing and, in some networks, a translator unit all add to the cost of the local-area network.

The use of dedicated processors for workstations enables multiuser systems to deliver processing power equivalent to that of a local-area net. But since the multiuser system is closely coupled, system communication is inherently faster than in a local-area network.

Single vendor may ease problems

A single vendor usually supplies and services the entire multiuser system. Because this vendor has designed the system, problems will probably be easier to diagnose and repair.

A local-area network, on the other hand, becomes a network of vendors as well as of personal computers. Local nets are usually installed after a business has purchased a few personal computers, and it is not unusual for the personal computers to come from different vendors. It is unusual for the networking hardware manufacturer to have also manufactured the personal computers. Installation and service means dealing with different vendors. And because no single vendor designed the entire system, network maintenance is more difficult.

Local-area nets will continue to appeal to businesses that have made a significant investment in personal computers and now recognize a need for multiuser capabilities. But as customers recognize the price, performance and service advantages designed into multiuser systems, these systems will become an attractive alternative to local-area networking.

Grant is president of North Star Computers, Inc., a San Leandro, Calif.-based manufacturer of multiuser microcomputers.

DO WHAT FORTUNE 1000 COMPANIES DO WHEN THEY NEED A PERSONAL COMPUTER...

RENT IT!

Whether you want one PC or one hundred, Continental Resources can deliver what you need. Choose from the most popular microcomputers:

IBM PC/XT/AT	Digital Equipment Rainbow 100	
NEC APC	AT & T 6300/7800	DATA GENERAL/One

Plus an extensive line of printers, plotters, mass storage and data communications devices, terminals, and much, much more from over 30 industry leaders.

What's more, you'll receive full service support on every piece of equipment you rent, lease, or purchase from Continental.

For a **free** comprehensive catalog, call the nearest Continental office listed below or write: Continental Resources, Inc., 175 Middlesex Turnpike, Bedford, MA 01730.

Continental Resources . . . a leader in high-tech products for nearly 25 years. *We deliver what you need.*

*IBM Personal Computer/XT/AT are trademarks of International Business Machines Corporation
*Rainbow 100 is a trademark of Digital Equipment Corporation.
*NEC APC is a trademark of NEC Information Systems, Inc
*AT & T 6300/7800 are trademarks of AT & T Communications
*DATA GENERAL/One is a trademark of Data General Corp

CR

CONTINENTAL RESOURCES, INC.

Corporate Headquarters
175 Middlesex Turnpike
Bedford, MA 01730

Chicago Area
(312) 860-5991

Baltimore — Washington, DC
(301) 948-4310

San Francisco Area
(408) 727-9870
(415) 441-0189

Los Angeles Area
(213) 638-0454

Boston Area
(617) 275-0850

New York, NY
(212) 695-3206

Northern NJ Area
(201) 654-6900

Philadelphia Area
(609) 234-5100

Dallas Area
(214) 458-7616

Special Report

Presentation graphics meets firm's need for flexibility

NEW YORK — Two and a half years ago, managers at a financial services firm here acquired access to analytical graphics output from micro spreadsheet packages. They liked it at first, but soon clamored for better quality.

"You get spoiled very quickly," said Brad Burnett, coordinator of an on-line portfolio analysis service at Shaw Data Services, Inc. "As we became more and more spoiled, we wanted to have increased flexibility with our graphics."

Specifically, the managers wanted presentation-quality graphics they could use as communication tools in-house and at client meetings. Shaw Data provides its clients, more than 200 money managers and banks, with access to and analysis of financial information.

The firm found spreadsheet graphics too limited for use in presentations because they provided few labeling options or chart formats, Burnett said. Shaw Data's managers wanted the ability to insert explanatory notes and comments anywhere on their charts and to choose appropriate formats for different types of information. They also wanted software that would allow them to output graphics to paper, transparencies or 35mm slides.

In the summer of 1983, the firm investigated six micro graphics software packages, bought copies of three of them for in-house testing and decided to purchase Graphwriter from Graphic Communications, Inc. Shaw Data installed its first copy of the software in the fall of 1983 and is currently running two copies, each on an IBM Personal Computer XT.

> *The firm found spreadsheet graphics too limited for use in presentations.*

Top managers from various departments within the firm design charts and graphs using paper worksheets provided with the software. They pass the worksheets on to secretaries and low-level managers, who sit down at the Personal Computers with the graphics software.

The worksheets include all the questions the software will ask of the computer operator, such as which format, what kind of labeling and what type of output the final graph should have.

When a manager completes the sheet, his work is done. "I can hand that piece of paper to a secretary and have a graph back in 15 minutes," Burnett said. Using the worksheets to plan charts helps Shaw Data make effective use of its expensive microcomputers, he added.

The software itself is menu-driven and provides 23 different chart and graph formats. Burnett said the variety allows Shaw Data's employees to choose appropriate graphics for the topics they want to present.

The firm's client services staff, for example, produces pie charts that break down inquiries the staff receives from clients into categories such as performance, pricing and accounting. With the pie charts, the staff can see what type of information customers request most often and can prepare itself to answer their questions.

Burnett uses a combination bar/line chart to plot Shaw Data's hardware and software expenses over time. The bars on the chart show how expenses increase and decrease from month to month. The lines, which connect the tops of the bars, show general trends.

Shaw Data's accounting department makes bar charts, line graphs and combination graphics that track payables and receivables, and its personnel department uses various formats to show employee concentration and growth. "Almost everyone in our organization now has access to graphics," Burnett said.

Besides providing the in-house applications, the software helps the firm deal with suppliers and customers. Shaw Data gives many of its customers access to financial information over dedicated long-distance telephone lines.

As such, AT&T is one of its prime suppliers. With the graphics software, employees plot line downtime; they use the graphs they produce to negotiate service agreements with AT&T, according to Burnett.

A set of monthly graphs that Shaw Data's systems group creates shows how long customers must wait to receive information over phone lines. These graphs depict average response times for different geographical areas. With them, Burnett said, "we can plan equipment purchases and system enhancements to better meet the ever-increasing needs of our clients."

If a customer calls to report a delay, for example, Shaw Data's employees check the customer's reported response time against the average for his area. A response time that varies significantly from the average may signify a problem phone line and prompt a line upgrade.

For transparencies and slides

The firm also uses the graphics software to produce transparencies on two Hewlett-Packard Co. plotters, one 7470A two-pen and one 7475A six-pen plotter, and to make 35mm slides on a Polaroid Palette system. The slides and transparencies supplement presentations that Shaw Data makes to individual clients and to its annual client seminars — regional meetings that attract between 150 and 200 people.

With the software and the plotters, each transparency costs approximately $1 and each slide about 35 cents to produce. The firm previously relied on a graphics artist to make slides and paid him $20 for each one. "We are overwhelmed by the difference in price," Burnett said. He added that turnaround times for presentation graphics have also improved.

The software has some built-in warnings to steer users away from poor chart design. If a user attempts to use a format that is inappropriate for the data he wants to display (for example, if he tries to draw a line graph rather than a pie chart to show segment information), the software denies the user's request. "You don't even get an option to try it," Burnett said.



Only the Polaroid Diskette in the gray box offers a free data recovery service. So, if a piece of tape sticks to it, we can recover your data. (And most other accidents, too.) Call 800-241-4403. Because accidents happen.

© 1985 Polaroid Corp. "Polaroid"® of Polaroid Corp. "PerfectData"™ of PerfectData Corp.

Special Report

Clients benefit from service's software savvy

When Shaw Data Services, Inc. recognizes the value of a software package, it passes the hot tip on to its clients.

In the past, Shaw has drummed up support for spreadsheets, word processing programs and other micro software. One of its current crusades centers on microcomputer-based presentation graphics.

According to Brad Burnett, coordinator of the firm's Gateway Project, money managers must go one step beyond making keen financial analyses if they are to win investors' trust — they must present their findings to clients as effectively as possible. "The delivery of that analysis is critical," he said, "and that includes the right visual aids for maximum impact."

Shaw Data's Gateway Project is an on-line data retrieval service that operates over 4.8K-byte dedicated phone lines. The lines give customers with microcomputers access to financial information stored in four 8M-byte Honeywell, Inc. DPS 8/49 mainframes at Shaw's Warren, N.J., data center.

Clients get a copy of Shaw's proprietary Translator II software, which lets them download information from the Honeywell CPUs and use it with word processing and spreadsheet packages.

As part of the project, Shaw Data evaluates third-party software packages and recommends certain offerings to its clients. If the firm finds a product useful, it lets clients know about that product through a monthly newsletter.

According to Burnett, Shaw Data does not enter into contracts with software vendors; it merely tells customers, "This is what we know and recommend," he said.

After the firm installed Graphic Communications, Inc.'s Graphwriter software in-house, it began recommending the graphics package to its clients. Since then, about one-third of Shaw's Gateway customers have purchased copies for their users, according to Burnett.

He said the software met the needs of Shaw's clients — investment advisors, bank trust departments and corporate pension fund sponsors — because it offered a variety of formats and worked with a number of different output devices and because its menu systems provided a good interface for financial users. The software also provided the ability for Shaw Data's clients to use presentation graphics software in conjunction with other programs. Users can, for example, use the Data Interchange Format to take data directly from Software Arts, Inc. Visicalc or Lotus Development Corp.'s 1-2-3 spreadsheet packages and work it into charts and graphs.

With presentation graphics capabilities, the firm's clients can "complete the flow of information all the way through to their clients and prospects," Burnett said.

OVERHAUL from SR/30

labor rate. Managers predict how many hours they will need for each task, and their predictions are fed into the system. After users approve completed tasks, the tasks' completion dates are entered, and the system calculates achieved labor rates.

Project managers are judged by how well they meet their predictions: If the managers plan to devote 40 hours to a task, they receive 40 hours worth of credit for the completed task, regardless of how many hours their staff members actually devoted to the job.

Strowbridge said that the setup requires managers both to execute tasks efficiently and to plan them well. If they plan for a 40-hour task and consume 60 hours (a 66% achieved labor rate), 20 hours worth of work goes without credit; if they complete a 40-hour task in 20 hours (a 200% achieved labor rate), they exhibit bad planning skills.

The software system generates monthly achieved labor reports, which go to top managers in the MIS department. Strowbridge said he uses these reports to show the firm's corporate executives how well his department has met its productivity goals.

He said achieved labor reporting is new to MIS managers but familiar territory for other executives. "They live in that world," he said, and MIS benefits from working in the same environment.

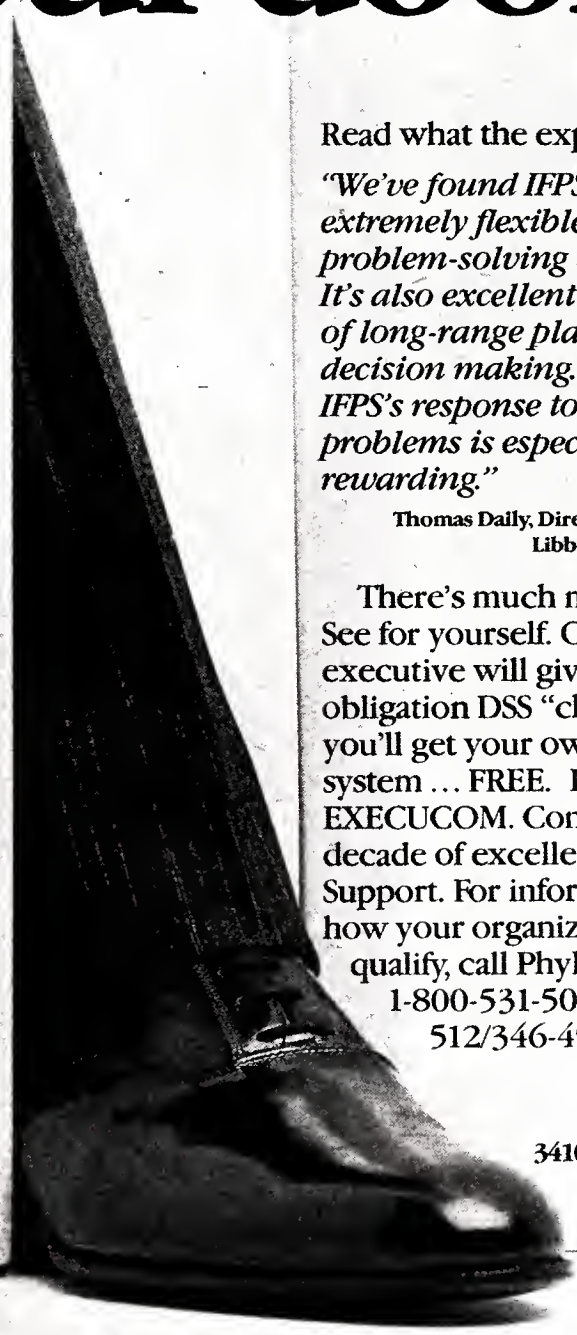
Strowbridge uses other reports generated by Microman to apprise top management of backlogs, staffing needs, budgets and other MIS status indicators. He also justifies user charge-backs based on information the system produces.

"These reports enable me to really give our senior management a handle on what [MIS] is doing for the company," he said. "They're a great communication tool for us because they make our work immediately clear and comprehensible."

The reports are tailored by frequency and by level of detail to different groups of managers. Top managers in the MIS department receive monthly reports that are summaries of overall activity. Project managers, on the other hand, get weekly detail reports of their tasks.

According to Strowbridge, the weekly reporting procedure helps managers stay on top of their projects. "It tells you if you're in trouble, and you can take corrective action immediately," he said.

All we want is to get our foot in your door.



See an EXECUCOM account executive about our mainframe Decision Support System and get your own desktop version—FREE.

How can you lose? Discover how your organization can dramatically increase productivity with IFPS®, the world's leading Decision Support System, from EXECUCOM—the leading DSS software company. In return, receive our PC version*. IFPS is the essential tool for strategic planning...perfect for cash flow analysis, budget forecasting and reporting, data consolidation and market simulation. Goal seeking, "What If?", optimization techniques and risk analysis features guide and support crucial business decisions.

IFPS can be implemented with a minimum of effort and is supported by on-staff specialists and a toll-free hotline. In fact, it's installed and running in hundreds of major companies across America and around the world.

Read what the experts have to say:

"We've found IFPS to be an extremely flexible tool for use in problem-solving applications. It's also excellent for any kind of long-range planning and decision making. We find that IFPS's response to the tough problems is especially rewarding."

Thomas Daily, Director of Planning Systems
Libbey-Owens Ford Company

There's much more to IFPS. See for yourself. Our account executive will give you a no obligation DSS "checkup" and you'll get your own desktop system ... FREE. IFPS. From EXECUCOM. Continuing a decade of excellence in Decision Support. For information on how your organization can qualify, call Phyllis Shockey at 1-800-531-5038 (in Texas 512/346-4980).

EXECUCOM
3410 Far West Boulevard
Austin, Texas 78731

*Requires IBM PC, XT, AT or compatible, 512K MS-DOS.

EXECUCOM
A CONTEL COMPANY

Special Report

DP professionals rank high as critical system resource

Micro equipment, training, integration mean nothing without effective control

By John A. Devolites
Special to CW‡

Not all corporations have had good fortune acquiring microcomputers. Some corporations seem to be following such ludicrous guidelines as the following:

■ Local-area networks are in — they are stylish and only require a coaxial cable.

■ Forget about compatibility — sooner or later everything will be integrated.

■ Buy cheap software — after all, expensive software really does not work that much better.

■ Take advantage of bankruptcy actions — although a microcomputer manufacturer may have fallen on hard times, it is a golden opportunity to pick up machines at unbelievable savings.

■ Anyone can program — programmers use Cobol, but Basic is just as good.

Such questionable advice runs rampant these days because just about everyone — from the organization's vice-president for public affairs to the purchasing director — fancies himself an expert on microcomputers.

Unfortunately, many corporations have overlooked an important resource in their rush to automate — the DP professional. As a result, they have confused the capabilities of personal computers, mainframes, word processors and other equipment; underestimated the need for training; and overestimated current integration capabilities, among other mistakes.

It is a sad state of affairs — one that could be prevented by establishing effective control over microcomputers.

Where the responsibility for this control resides within an organization is important, but it is not as important as the basic need for such control. To solve these problems will require a consistent, practical approach to information management within each corporation. That is how control is defined.

It can be achieved in large part by following a more intelligent set of guidelines than those mentioned above. The three most important are the following:

> *Many corporations have confused the capabilities of personal computers, mainframes, word processors and other equipment; underestimated the need for training; and overestimated current integration capabilities.*

■ **Standardization.** — Most large corporations decide on a specific vendor before their first major microcomputer acquisition is made. Others, however, acquire a potpourri of microcomputers. Standardization reduces the overhead costs of acquiring, maintaining and developing microcomputer systems.

The level of standardization should include the amount of memory, type of disk drives, software packages, communications, printers and displays. Keep in mind that many microcomputer distributors offer trial evaluation periods for computers, software and peripherals.

■ **Vendors.** — The selection of a vendor to provide microcomputer systems really boils down to the initial and ongoing investment the corporation plans to make in the technology.

Some companies have standardized on certain microcomputer configurations with third-party add-on boards and peripherals. The cost savings of this approach are substantial, but long-term integration and maintenance can be issues.

Overall system maintenance should also be considered. Some companies negotiate a fixed price per system; other companies have elected to use a time-and-materials approach when it comes to systems maintenance.

■ **Planning.** The investments major corporations have made in micro technology dictate the need for formal planning. These questions should be answered before microcomputers are purchased:

■ Are they needed?

■ Who is going to use them?

■ What are they going to be used for?

■ Who will be responsible for them?

■ What types of hardware and software should be bought?

■ Will this hardware and software work with other systems?

■ Who will be responsible for training and what will it entail?

■ How will the microcomputers be used three years from now?

Providing answers to these questions may seem difficult, but it is a requirement in today's large corporations where there is a tremendous temptation to write a purchase order and buy without forethought. The low cost of micros in combination with decentralized buying authority can create havoc.

Integrated planning may initially delay the acquisition, but over the life span of the technology it will substantially reduce frustration and costs.

Some corporations assemble a team of in-house experts. Others may rely on external resources when planning for integrated microcomputer acquisition.

Devolites is DP director for the government divisions of Booz-Allen & Hamilton. He is responsible for directing the departments of Computer Operations and System Administration, Configuration Management, Software Development and Special Projects.



Only the Polaroid Diskette in the gray box offers a free data recovery service. So, if it gets dog-eared, we can recover your data. (And most other accidents, too.) Call 800-241-4403. Because accidents happen.

© 1985 Polaroid Corp. "Polaroid"® of Polaroid Corp. "PerfectData"™ of PerfectData Corp.

See Backlog.



Dick is a gloomy programmer. Dick gets caught in mainframe logjams. Buried in backlog. Drowned in printout. His work gets out slowly.

Jane is a jolly programmer. Jane does all her programming off-line. On the PC. Jane uses VS COBOL Workbench.* From Micro Focus.

See Backlog Go.

It gives Jane a superior mainframe programming environment. For development. For testing. For maintenance. For mainframe users who don't like to wait. It's specially tailored to the IBM* PC.

Writing mainframe programs is fast with VS COBOL Workbench. Because it closely couples highly integrated programming tools. Jane gets powerful editing. An SPF-compatibility option. OS/VS COBOL*- and VS COBOL II*-compatible syntax checking. Interactive source code debugging. An application prototyping tool. IMS and CICS data simulation capabilities. Support for all IBM PC-family keyboard and display capabilities. And more. Now Jane can respond quickly to users' needs. They smile and make her glad.



This DP manager is a hero. Because programmers are more productive. Users are grateful. And the company is more prosperous. All thanks to VS COBOL Workbench.



Bye Bye Backlog.

See VS COBOL Workbench now.

Put your DP shop on the fast track. Run to your phone. Or fill out the coupon. Right now.

MICRO FOCUS

U.S. Headquarters, Palo Alto, CA: 415/856-4161
Philadelphia office: 215/668-0961
Washington, D.C. office: 301/231-9877

*Micro Focus and VS COBOL Workbench are trademarks of Micro Focus Ltd. IBM, IMS, CICS, OS/VS COBOL, and VS COBOL II are trademarks or registered trademarks of International Business Machines Corp.

Micro Focus, 2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303.

Quick, send me more information.

Name_____ Title_____

Company_____ Phone_____

Address_____

City_____ State_____ Zip_____

Special Report

Programmers will hold out for practical workstation

By Jim Dickie
Special to CW‡

While administrative users have willingly embraced the microcomputer, programmers have typically shied away from it, choosing instead to continue using IBM 3270-type terminals attached to mainframes.

They have had no justification for purchasing micros; their work entails developing applications to run on large mainframes, and there has been a lack of micro software capable of helping them with this sophisticated task.

Programmers have no aversion to microcomputers. Their reaction to the idea of micro workstations is generally positive. They find the interactivity, detailed graphics capability, user interface and other features that microcomputers offer very attractive. They respond positively to the idea of moving development and testing activities to microcomputers.

When vendors offer practical micro workstation systems, those that justify the use of personal computers rather than mainframe terminals, programmers and other power users will be glad to use them. Micro workstations will increase programmers' productivity by removing the constraints of mainframe response time and will also offset mainframe processing burdens.

The microcomputer programmer workstation market presents software vendors with a major growth opportunity. It offers them the chance to venture outside the saturated markets for word processing, spreadsheet and graphics software and to move into an untapped area with more than one million potential users.

Hardware manufacturers have started to design machines — the IBM Personal Computer XT/370, for example — that support the concept of programmer workstations. Mainframe software vendors have started to transport workable subsystems of their programs to microcomputers.

The real goal, however, is not to make the microcomputer a subset of the mainframe but to take a totally new approach to applications development, an approach that takes advantage of the capabilities of the microcomputer. This approach must, however, take into consideration what happens to programs once they are sent to the mainframe.

In order to design software to support the workstation concept, vendors will have to consider three sets of requirements: one for the micro, one for communications and one for the mainframe.

Micro software requirements

The architecture of the system that runs on the micro workstation should be a true fourth-generation language. It need not help programmers code Cobol or assembler but should help them solve business problems. It should have all of the attributes of a mainframe fourth-generation tool — a nonprocedural language and intelligent use of defaults, for example — and should allow users to get results in one-tenth of the time they would need with lower level languages.

The language itself should also relieve users from worrying about the environment under which the applications will run. Whether the program being developed is meant to run as an on-line or batch program on the mainframe, or as a stand-alone application on the microcomputer, the use of the system should remain constant.

The system should do all of this while taking advantage of the benefits that micros offer. It should, for example, allow for applications flowcharting with microcomputer graphics. It should

---

Dickie is director of product marketing and support for the MIS division at Informatics General Corp.'s Canoga Park, Calif., office. Informatics General markets mainframe programming tools.

Five ways Honeywell helps pe

No matter who made your PCs, or where you use them, you should consider TotalCare,™ single source service from Honeywell.

A company with dozens, hundreds or even thousands of PCs scattered around the country has very special service needs. That's why Honeywell TotalCare service is just what the doctor ordered.

A comprehensive TotalCare service program assures that you get:
Customized service—a program tailored to *your* company's needs.
Consistent service—for *every* location.
Professional service—experienced computer service engineers fully equipped to meet your every service need.
Dependable service—an organization you can count on.



Special Report

development before they jump on micro bandwagon

have field-level facilities and a menu-driven option to help first-time users. The system should be totally self-contained so that programmers can work independently of mainframe outages or line problems.

The most significant capabilities a micro workstation can offer are interactive prototyping and development and off-line testing. These features would allow programmers to involve users in an evolutionary approach to applications development, one in which the prototype expands in detail until it becomes a working system.

Communications requirements

The microcomputer workstation should also be rich in micro-mainframe link capabilities. However, vendors who offer systems that merely provide an easy means of uploading and downloading programs for development and maintenance will not provide enough value.

In addition to these capabilities, a link should allow for the selective extraction of data from mainframe data bases to facilitate the prototyping and testing process. It should also offer the ability to share information among a number of programmers. Links for microcomputer programmer workstations should be able to meet the same hardware requirements that traditional links do: They should support asynchronous, bisynchronous and Synchronous Data Link Control via a variety of add-on boards and protocol converters. The lack of communications standards makes this flexibility crucial.

Host software requirements

The mainframe host should address four functional areas: security, resource utilization, environmental intelligence and data base management system (DBMS) transparency.

■ **Security.** Because they will provide the ability to do development and testing off-line, microcomputer programmer workstation systems should include user profile arrangements at the host. The systems should be able to identify individual users by either passwords or serial number checks and to determine what types of operations specific users can perform. They should be able, for example, to track the applications that each programmer has developed and is allowed to maintain. The systems should also control file access and determine whether a specific user can report, update or browse in a given file.

■ **Resource utilization.** The code generated on the microcomputers should be able to run efficiently on the mainframe. There should be no reason to give up cycles in exchange for boosts in productivity. In the case of on-line programs, the mainframe system should be a compiler that generates source code modules. It should have the intelligence to analyze the task at hand and generate appropriate calls (in contrast to using a fixed-call strategy for all applications). In order to serve reporting applications, the host software should include a processing priority scheme and should provide for the automatic batching of tasks that access the same data.

■ **Environmental intelligence.** This feature should remove the need for programmers to understand the operating system under which different applications will run. The mainframe system should analyze the operating system and automatically generate its specific parameters. It should also generate appropriate teleprocessing code for applications that will run on-line.

■ **DBMS transparency.** The system should provide independence in regard to the files that programs must access. Based on what the program is designed to do, the mainframe software should generate all the calls that are necessary to access data from flat files, hierarchical files, relational data bases or a combination of any of these.

onal computers get well soon.

Cost-effective service—a program that helps keep your service costs in line with your budget.

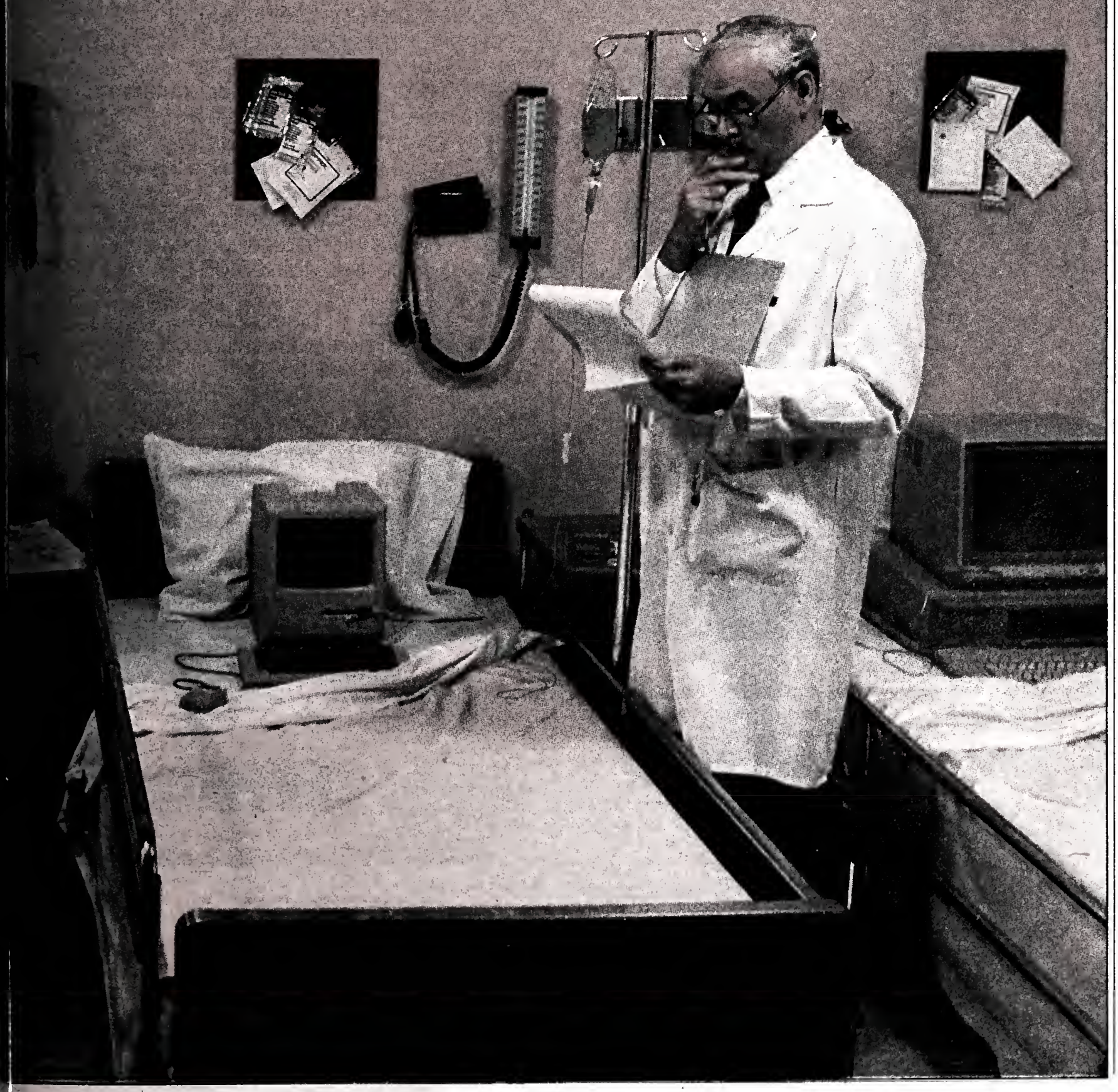
Honeywell TotalCare is a comprehensive service program provided by an organization of service professionals in more than 250 locations plus a network of walk-in/mail-in service centers—nationwide. Ready to serve you in every phase of computer system maintenance. Ready to provide total care for all your PCs.

For more information on TotalCare for PCs call 1-800-328-5111, ext. 2751 or write: Customer Services Division, Honeywell, MS 440, 200 Smith Street, Waltham, MA 02154.

Honeywell 100 Years

Together, we can find the answers.

Honeywell



INTRODUCING NEAR LETTER QUALITY AND THROUGHPUT SPEEDS OTHER PRINTERS CAN'T COME NEAR.

The new C.Itoh ProWriter™ 8510S-LQ Near Letter Quality printer is a whole new field of one.

It's priced at just $549. But it gives you near letter quality printing for beautifully sharp characters like printers costing hundreds of dollars more.

And in a text and graphics speed test against its closest competition, namely the Epson® FX-80 and the Okidata Microline 92, the new and faster C.Itoh 8510S-LQ out printed them all.



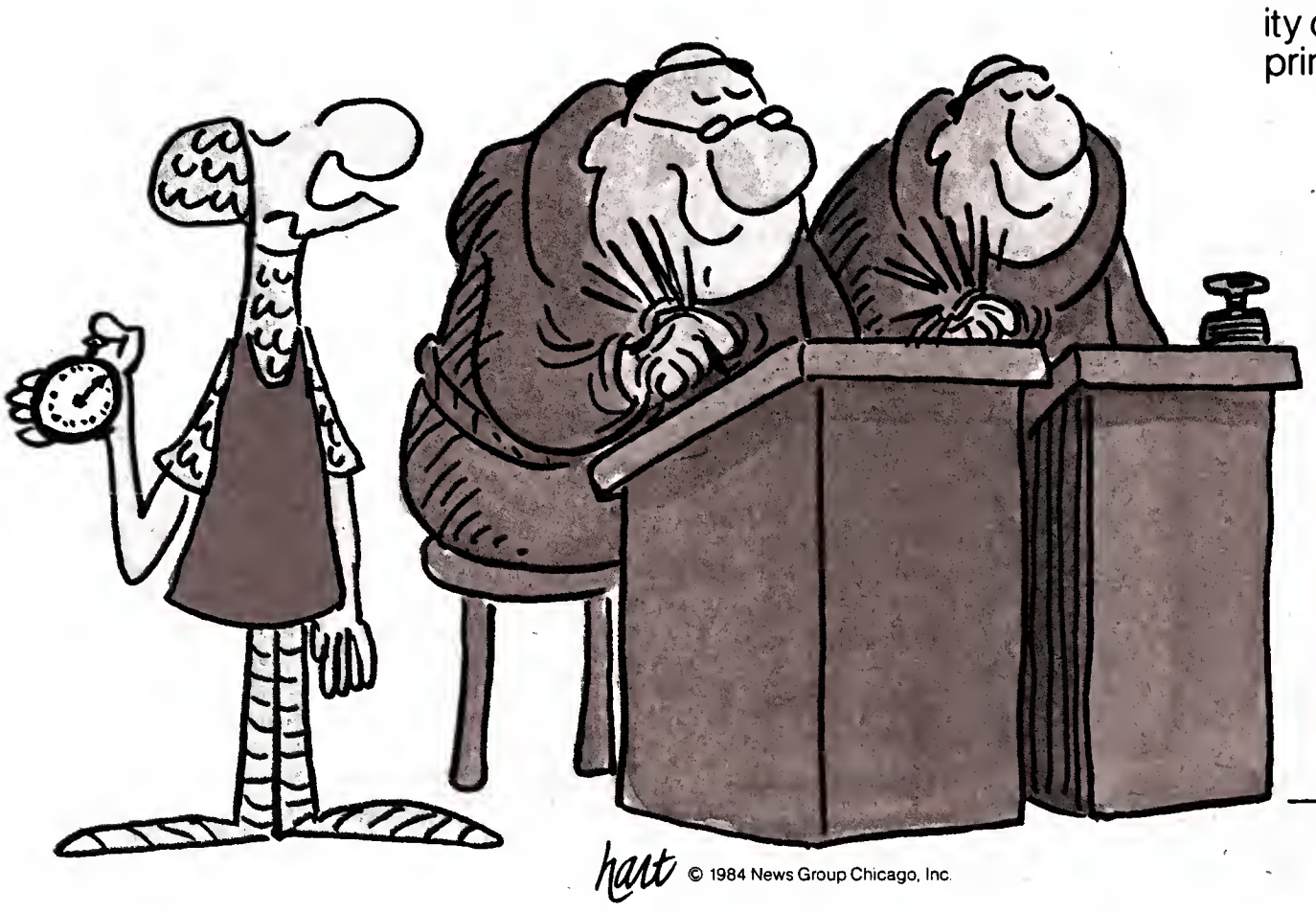
The stopwatch proved that the 8510S-LQ, at throughput speeds of 100 full lines per minute, printed text up to 35% faster than the competition. And it created bar graphs and pie charts up to 54% faster.

Of course, speed in itself does not keep a printer in a class by itself. Reliability does. That's something no C.Itoh printer has ever lacked. No other printers are more thoroughly tested or proven on the job. Which is why C.Itoh printers continue to be the world's best sellers, with 1.7 million sold last year alone.

For more information on the new and faster C.Itoh 8510S-LQ or wider carriage 1550S-LQ Near Letter Quality printers just see your C.Itoh dealer. Or call us toll free at 1-800-423-0300.

Or write C.Itoh Digital Products, Inc., 19750 South Vermont Avenue, Suite 220, Torrance, CA 90502.

™ ProWriter is a Trademark of C.Itoh Digital Products, Inc.
® Epson is a Registered Trademark of Epson America, Inc.
© 1985 C.Itoh Digital Products, Inc.



hart © 1984 News Group Chicago, Inc.



C.ITOH
Printers

See us at Comdex Booth # 1708 GWCC East Hall

Special Report

Information age demands adjusted management skills

By William Godbout
Special to CW‡

The real value of microcomputers in the workplace is in the amplification of individual human effort and human skills — raising the individual's productivity by improving his creativity. Increased productivity is vital to bringing about the reindustrialization of the U.S. and its conversion from a smokestack society to an information society.

One of the ways to speed this conversion to an information society is to develop a matrix of management skills within which to employ microcomputers, workstations, mainframes, communications, networks and all other rapidly developing electronic tools available.

The result may be the redefinition of information management. And the time is right for bringing this new management matrix to bear on microcomputers in the office.

The first key point in applying management skills to microcomputers in the workplace is realizing that these capable machines are every man's tool, not just the wards of the DP department. If a manager starts developing another cult of high priests around micros from a user's standpoint — the true application standpoint — the effort will fail.

Those "everyman computers" now exist and they are getting better, faster and more capable every day. The improvement of work output through tools such as scientist/engineer workstations, dedicated administrative workstations, computer-aided design, graphics and manufacturing computers and many other desktop applications is now evident, even at this early stage of microcomputing in the workplace.

Managers must also realize what the single microcomputer or even groups of stand-alone or networked micros cannot do.

But first, managers must recognize what they must do. Microcomputers in the corporate environment should have the following capabilities:

■ **Administrative reporting.** In the management of any project, administration and reporting are key requirements. General-purpose micros running word processing software meet those requirements very nicely.

■ **Modeling.** Whether it is accomplished through physical or mathematical models or computer simulation, modeling is a microcomputer requirement. At certain levels of modeling requirements, general-purpose micros, using spreadsheet software and capable of making rapid "what-if" manipulations, are satisfactory.

■ **Communications.** Another key requirement for microcomputers is that of communication, either with other micros or the mainframe.

The major problem in those three key areas — is that no manager today can pull a general-purpose microcomputer off the shelf, drop it on a desk and say, "This will do your word processing, modeling, number crunching and handle all your communications." That machine does not yet exist and may never exist, though it is a machine that all manufacturers are trying to build.

What is more likely to happen is a general case solution that will involve microcomputers and workstations and that will satisfy about 80% of all engineering, administrative, scientific and business applications at the individual's desk and under his total and local control.

But the other 20% will be met by the capabilities of highly specialized machines, with rigorously optimized hardware and software that makes them ideal for highly specialized control tasks, guidance tasks and data base management tasks. However, those machines are basically unsuitable for general computing.

Management skill enters in after that 80th percentile. The best manager must be able to answer the question, "Can the job be done with a single off-the-shelf microcomputer, or will we need additional special and dedicated hardware and software?"

Summing up those two key points in the managerial question, the person charged with deciding to install microcomputers must first be able to answer the question: "Can we use electronic equipment as an amplifier of individual human effort in this application?" If the answer is yes, he then can ask whether or not a single, off-the-shelf micro can fill his needs.

Managers charged with bringing micros into the workplace have a great opportunity in the next two years to do it right. There is enough experience with micros to avoid time-consuming mistakes, there is enough solid direction from industry leaders to make very good estimates of where the future lies and there is enough actual experience already in the workplace to provide a history of what works and what doesn't.

Managers must now superimpose their own styles of management expertise on that growing body of hardware knowledge.

Godbout, chairman and CEO for Viasyn Corp. (formerly Compupro Systems, Inc.) established Compupro as a manufacturer and supplier of microcomputer systems and components. Compupro changed its name to Viasyn this year.



Downtime. Uptime. In Time. Every Time. Six words that tell the story of quality service. Told by TRW, the company that lives by these words. Our principal business is the expert maintenance and repair of your system's hardware. Expertise you can rely on to reverse downtime to uptime. In time. Every time.

Because we maintain a wide variety of sophisticated electronic equipment, TRW is the only source you may need to keep your hardware performing at peak efficiency.

1000 IBM PC's in Boston. 200 Altos systems in Detroit. An IBM Mainframe in New York City connected to an assortment of TeleVideo, Esprit and Wyse terminals in 30 different sites and ten different cities. Plus 5 Dataproducts printers in L.A. We can do it all.

Service for over 50 brands . . . and growing. In applications that are reshaping American business, industry and government. Office Automation. Banking Systems. ATMs. Telecommunications. Networking. Point-of-Sale Systems. Medical Electronics.

Whatever your requirements, chances are there is a TRW Service Program available that will more than satisfy your expectations. And fit very comfortably within your budget. Today. Tomorrow. Next month. Next year.

There's more to our story. To get the facts, call 1-800-257-7464. Today!

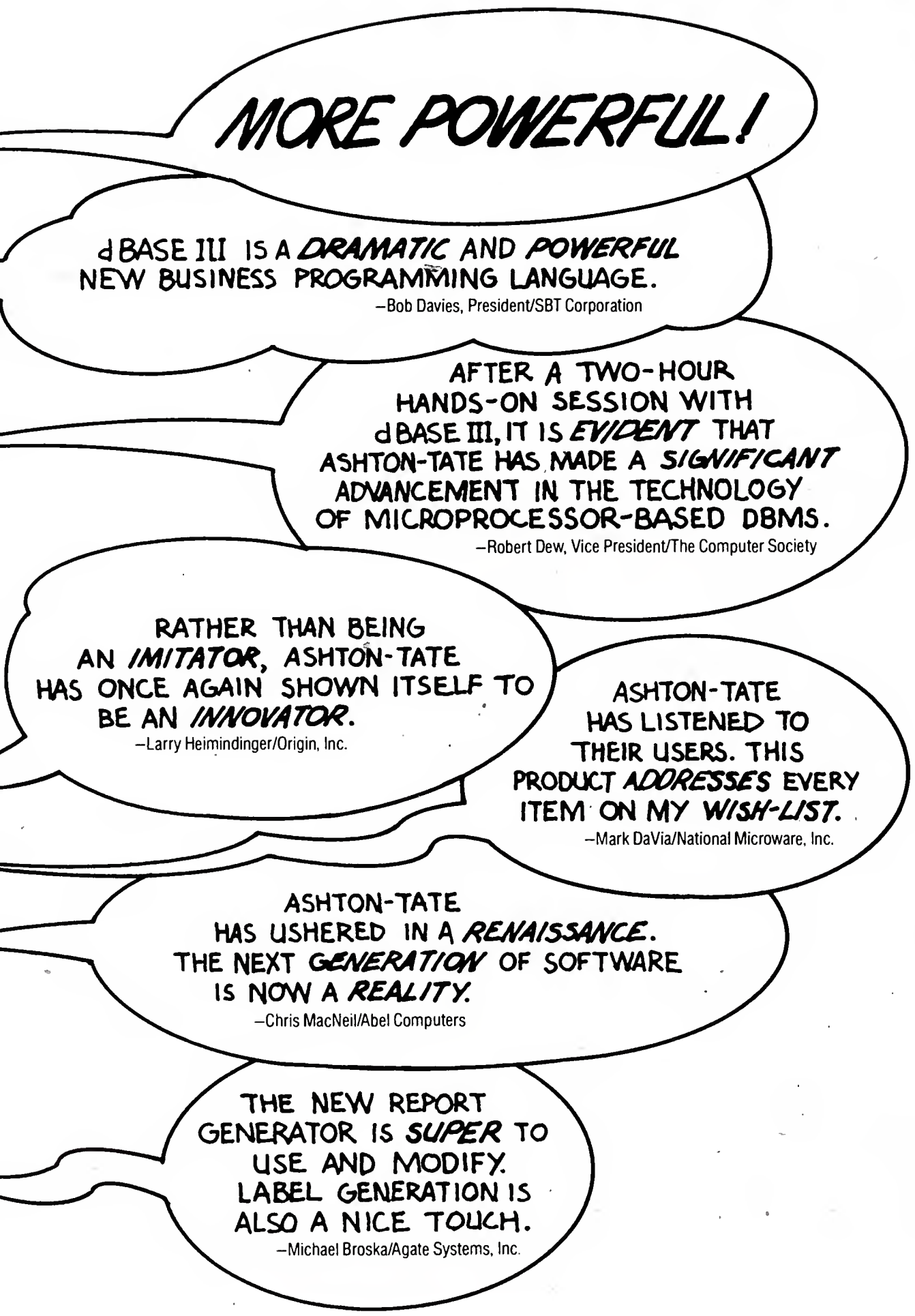
Service solutions for tomorrow: They're taking shape at a company called TRW.

TRW Customer Service
15 Law Drive
Fairfield, NJ 07006

TRW Nationwide Service From A Company Called TRW

©TRW Inc., 1985 TRW is the name and mark of TRW Inc.

dBASE III v



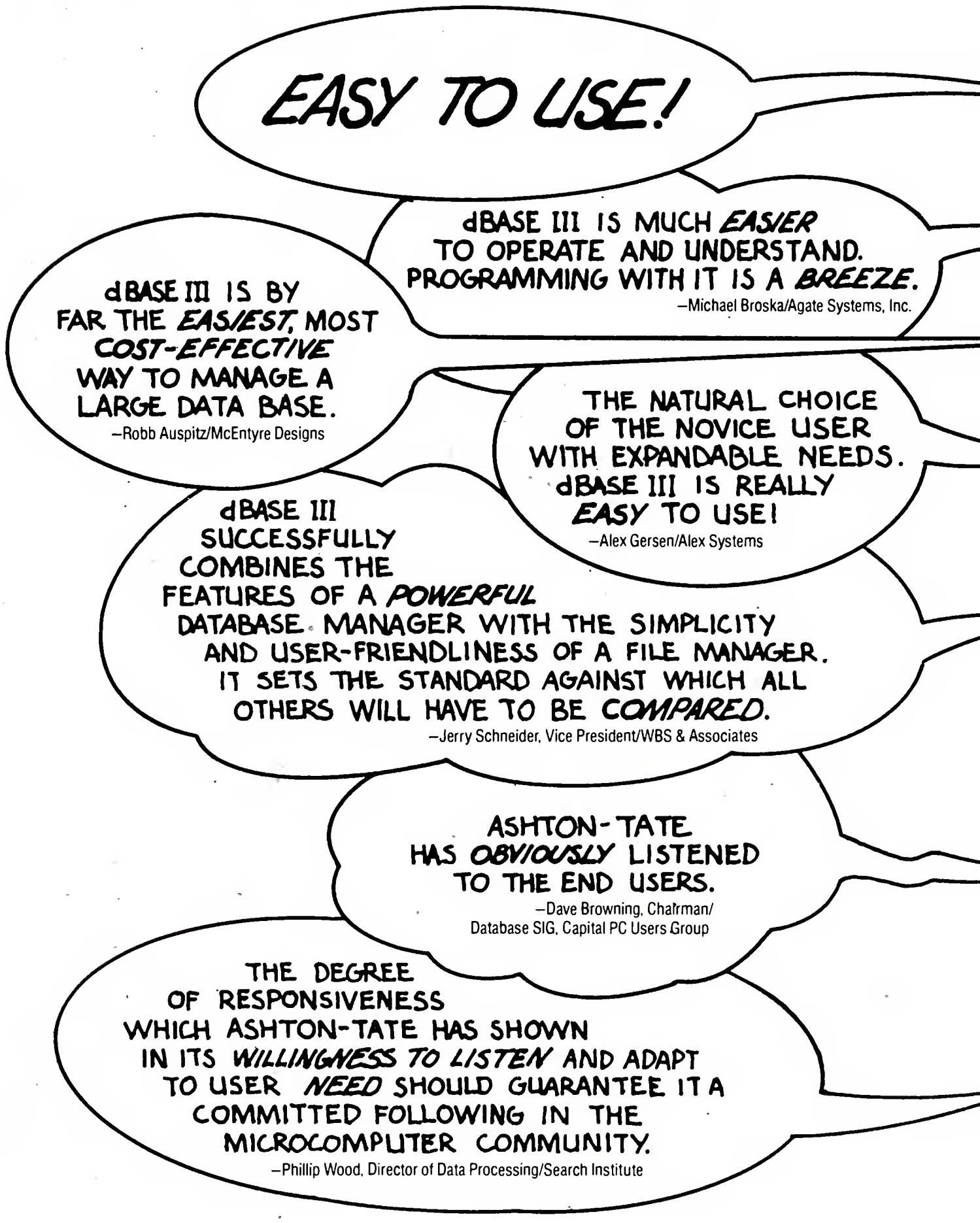
dBASE III™ is the powerful and easy-to-use relational database management system you've been waiting for. You can use it without hesitation whether you're a beginner or an expert.

The big winner in the easy-to-use vs. more powerful controversy is you.

If you want to know all about dBASE III, come to your Ashton-Tate software dealer for a free demonstration. For more information call (800) 437-4329 ext. 2322 or in Colorado call (303) 799-4900 ext. 2322.

dBASE III and Ashton-Tate are trademarks of Ashton-Tate. ©Ashton-Tate 1985. All rights reserved.

s. dBASE III



Software from

ASHTON-TATE™

We'll put you in control.

Special Report

Emulator offers insurer premium access to software

APPLETON, Wis. — A link between AT&T Unix-based micros and an OS/MVS mainframe has provided an insurance firm here with a low-cost solution to a high-priority problem.

Homeco Life Insurance Co., a small affiliate of the Home Mutual group of life insurance companies, began in 1983 to offer its clients interest-sensitive insurance policies. These policies, which feature fluctuating interest rates, changing values and variable premium schedules, required more sophisticated record-keeping systems than the firm had on hand, according to Ed Patschke, Homeco's vice-president.

The firm had installed an office automation system for word processing and other tasks, but it did not have software sophisticated enough to support the interest-sensitive policies. "We had to get a system up quickly," Patschke said.

Homeco investigated software packages that could run on its AT&T Unix-based system — four Fortune Systems Corp. 32:16 micros that each supported four CRT terminals — but found them too expensive. Software that could process the life insurance policies carried license fees of about $250,000 and maintenance and installation costs that would have brought Homeco's investment to $300,000, Patschke said. "We knew we couldn't afford that."

Instead, Homeco decided to use a time-sharing service bureau to process its interest-sensitive claims. Homeco's managers signed a contract with TPA Systems, Inc. of Kansas City, Mo., a service bureau that ran policy-processing software under MVS/OS on a 32M-byte Amdahl Corp. 580 Model 5860 mainframe. Patschke said that TPA offered Homeco some significant benefits, including low cost — processing fees of $25 a policy — a proven track record and the ability to bring the system up quickly.

The service bureau's mainframe could also capture information from the policy transactions on magnetic tapes that could later be run through a 4M-byte Honeywell, Inc. DPS 8/44 mainframe in Home Mutual's headquarters. Homeco maintained its billing and accounting records on the Honeywell machine.

Incompatibility between Homeco's micros and the service bureau's mainframe posed a problem, however: Patschke though he would have to invest $7,000 in an IBM Personal Computer that his employees would use only for tying into a time-sharing service.

Before he bought a Personal Computer, Patschke attended a computer show where he saw a demonstration of a hardware/software terminal emulator that allowed Fortune micros to appear to MVS mainframes as IBM 3270-type terminals. He purchased the emulator, SST, Inc.'s Handshake II, and brought it up on one of Homeco's micros. The emulation hardware and software and the installation of both cost Homeco about half the price of the IBM micro, he said. In addition, the emulator allowed the firm to make use of its existing equipment.

Policy data

When Homeco's agents sell interest-sensitive policies, they mail an application form to the firm's headquarters. Employees key in data about the policy on a Fortune CRT terminal. The microcomputer that runs the terminal connects with the service bureau over a dedicated line, and the CRT operates as a remote on-line terminal to the service bureau's mainframe. When employees at Homeco key in policy information, it immediately enters a mainframe data base.

The service bureau's mainframe processes the data and creates an extract tape that TPA mails to Home Mutual for entry to the DPS 8/44. Employees at Homeco's headquarters can also request status reports from the service bureau mainframe. These are transferred on-line to the Fortune micro in Homeco's office and passed on to a Genicom Corp. printer that outputs hard-copy reports.

Patschke said the firm has been feeding its existing policy records to the service bureau and using the bureau's mainframe to maintain them but has not yet begun to issue new policies using the system. Next month, Homeco will start to use the system to record and process policies as its agents sell them.

Time savings

With the service bureau's software replacing the manual methods Homeco had been using to handle its interest-sensitive claims, the firm expects significant time savings, Patschke said. "There is no question that the software ... is going to streamline the processing."

In the future, Homeco plans to use its Fortune equipment and electronic mail software to set up a system through which it can exchange information with vendors who support its business.

Patschke said the company hopes, for example, to use electronic mail to receive blood test results and other information from outside laboratories. Homeco uses such data to help determine rates for insurance policies.

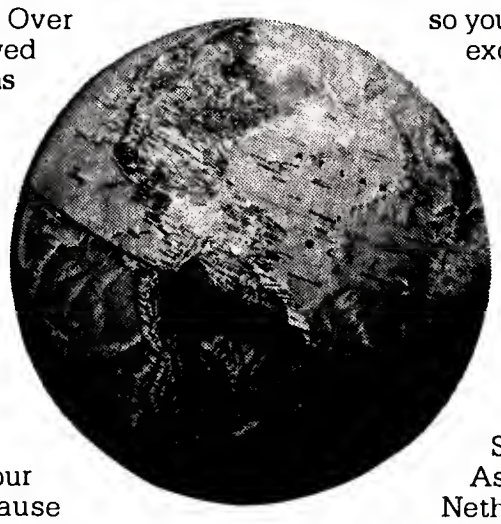
How to advertise in every major computer market in the world as easily as you advertise in the U.S.

CW INTERNATIONAL Marketing Services will help you penetrate the most profitable computer markets worldwide — easily, effectively, and economically.

Your ads will receive the attention they deserve. Our network of more than 55 computer publications in 25 countries is the largest in existence. Over 9,000,000 computer-involved people read our publications every month.

With more than 10 years experience in international marketing, we're the only service of our kind. We can help you make your ads more effective. Our local offices can translate your ads for a 15% surcharge on the space you purchase.

We'll help you increase your market penetration. Because we place your advertising through our U.S. office, you won't have to pay the VAT (value added tax, ranging from 8-20% of your ad-space purchases) which is regularly charged on all advertising placed abroad. And you'll be able to advertise in even more markets when you take advantage of our corporate discounts.



We're also available to advise you on your campaign strategy — such as when to advertise in order to coincide with special-focus issues and trade shows.

All you need to do is send us your advertising materials. We'll handle all the transactions. And we'll bill you in U.S. dollars so you won't have to worry about exchange rates.

Call Diana La Muraglia today if you want to reach the computer buyers in any of the following countries: Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, France, Greece, India, Israel, Italy, Japan, Korea, Mexico, Norway, People's Republic of China, Saudi Arabia, South Africa, Southeast Asia, Spain, Sweden, The Netherlands, United Kingdom, Venezuela and West Germany.

You can reach her toll-free at (800) 343-6474. In Massachusetts call (617) 879-0700. Or you can reach her through Telex, at number 95-1153. Or, if you prefer, fill out the coupon below and return it today. Do it now. The sooner we hear from you, the sooner you'll hear from our readers.

CW COMMUNICATIONS/INC.

Diana La Muraglia
General Manager
CW International Marketing Services
375 Cochituate Road, Box 880
Framingham, MA 01701

☐ Please send me more information about your International Marketing Services.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

MICROCOMPUTERS

Conferencing tool for IBM micros out

MENLO PARK, Calif. — An interactive teleconferencing package and a text/graphics electronic mail program have been introduced for the IBM Personal Computer line by Professional and Corporate Communication Systems, Inc.

CC:share, a real-time conferencing program, reportedly enables geographically separated users to run applications programs jointly over dial-up lines. Each user can see what the other is doing as it occurs on the screen, and they can pass control of the keyboard back and forth.

Potential applications include time-critical communications, presentations, remote software maintenance and software training, the vendor said.

CC:share reportedly supports two-way teleconferencing, alternate voice/data communications for one-way teleconferencing, file transfers and "snapshots."

At any time during the work session, the snapshot feature can capture a screen, compress it and store it as a PC-DOS file, the company said.

The CC:mail electronic mail package reportedly permits users to capture screens from an application and include them in a mail message or to attach application files to the message. The package also features a word processor, graphics drawing functions and a highlighter.

CC:share and CC:mail run on an IBM Personal Computer, Personal Computer XT and AT and compatibles with PC-DOS or MS-DOS 2.0 or higher. A Hayes Microcomputer Products, Inc. or compatible modem is required. CC:share requires an additional 26K bytes of memory space to run an individual application program. CC:mail needs 320K bytes of random-access memory.

In 10-unit purchases, CC:Share costs $195 per copy and CC:mail, $295 per copy.

Professional and Corporate Communication Systems is headquartered at Suite 160, 535 Middlefield Road, Menlo Park, Calif. 94025.

■ Tecmar's storage unit for IBM Personal Computers combines a 20M-byte hard disk drive with a 60M-byte tape backup system/**48**

■ IBM announced an entry-level version of its 5531 Industrial Computer/**48**

INSIDE

Software/**49**
Systems/**50**
Communications/**50**
Storage/**51**

SMALL TALK
Eric Bender
CW Senior Editor

Computerphones: What do you get?

At Compaq Computer Corp.'s flashy launch of its Telecompaq last month, company executives kept insisting that the new desktop is not a computerphone — a statement that mystified everyone because the Telecompaq meets every common definition of a computerphone.

The message Compaq tried to convey was that smooth integration of telephone and personal computer functions would create a new and highly flexible type of machine. "It's hard to get that point across," Compaq President Rod Canion acknowledged.

Despite all its marketing smarts, Compaq faces a tough struggle with its triple-threat, triple-disk-drive machine. Among the hidden dangers is the requirement to sell, through telecommunications channels, a product that DP organizations

See **NAME** page 52

Quickmac for 1-2-3 debuts

ELMWOOD PARK, N.J. — Fox & Geller, Inc. has introduced Quickmac, a software package that adds programming capabilities to Lotus Development Corp.'s 1-2-3.

Many 1-2-3 users are developing substantial programs with 1-2-3's built-in macro facility despite the limited tools available within that facility, Fox & Geller President Jeffrey Fox noted. These 1-2-3 diehards "can use Quickmac to create applications using a high-level language," he said.

With the new package, users running 1-2-3 reportedly will be able to type in familiar programming statements such as DO WHILE or IF THEN/ELSE. Quickmac then will generate complete programs, using 1-2-3's macro tools.

The programming language employed is similar to that used in Ashton-Tate's Dbase III, the company said.

Quickmac is said to include a full-featured screen editor, a syntax checker and a

See **FOX** page 51

R Systems unveils OA packages

DALLAS — Three office automation software packages for multiuser systems under AT&T Unix, Microsoft Corp.'s Xenix and Ryan-McFarland, Inc.'s Cobol Operating System have been introduced by R Systems, Inc.

The packages are also available in versions for single or networked systems under Microsoft's MS-DOS. File compatibility is offered between versions, R Systems said.

The new packages include an integrated office automation package, a word processor and a desktop manager.

The OA package, R Office, reportedly features word processing and desktop management functions along with data base management, spreadsheet and report-generating capabilities. Data can be shifted between applications in the package.

R Office's word processing functions are said to include document editing, formatting, printing and report generation. Six editing modes are available, as are unlimited formatting options and several built-in print options, including a quick-print feature to print out whatever is on

See **DEBUTS** page 51

Advertisement Advertisement Advertisement

IBM SQL/DS and DB2 relational DBMS now on PC

ORACLE, the relational DBMS compatible with IBM's SQL/DS and DB2, is now available on the IBM PC/XT and PC/AT. While SQL/DS and DB2 run only on IBM mainframes, ORACLE runs on IBM mainframes as well as on DEC, DG, HP and most other minis and micros. Any application written for SQL/DS or DB2 will run without modification on the complete range of systems supporting ORACLE, including PCs.

SQL/DS and DB2 are relational database management systems; ORACLE is a relational DBMS plus an integrated set of 4th generation software tools for application generation, report writing, color graphics and network communications.

Oracle Corporation introduced the first relational DBMS in 1979. Now, ORACLE provides the only complete implementation of the IBM-standard SQL language available for the PC.

Oracle Corporation cites three principal application areas for its product's capabilities:

■ **The ORACLE Application Development Center** provides a PC-based development center for the creation of DB2 and SQL/DS applications. The flexibility of the personal computing environment is made available to programmers creating applications for use with IBM's relational database products.

■ **The ORACLE Personal Information Center** extends the Information Center concept to the Personal Computer. ORACLE's application generator, graphics, spreadsheet and other end-user tools provide a SQL/DS and DB2 compatible Information Center on the desktop.

Users can become acquainted with the facilities and power of the Information Center in the personal computing environment, and transfer their knowledge and skills as the MIS Information Center facility evolves. The ORACLE Personal Information Center provides the facilities for MIS to develop the cooperative relationship with end users so vital to the success of the Information Center.

In addition, with ORACLE on departmental superminis, users can create identical Information Centers at the department level.

■ **The ORACLE Distributed Information Center** provides an intelligent set of communication links among multiple systems, with ORACLE running on IBM mainframes and various minis and PCs.

Using ORACLE's SQL*LINK networking facility, ORACLE on such diverse systems as MVS, VM/CMS, VAX/VMS, UNIX and PC/DOS can selectively exchange database information using the full capabilities of the SQL language. Applications, portable across all environments, can be run identically on any system, and data can be intelligently extracted for use at any site.

ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350 ext. 2043.

IBM unveils entry-level 5531 model

BOCA RATON, Fla. — IBM has released an entry-level model of its 5531 Industrial Computer and an industrial graphics display for factory floor operation. Both units are said to offer extended operation under conditions including high temperature, humidity, vibration and shock, power-line transients and particulate filtering. The IBM 5531 Model 011 OEM Industrial Computer — based on the Intel Corp. 8088 microprocessor — functions as an interface to plant equipment, worker-reporting terminals or supervisory workstations.

Standard features include a keyboard, 256K bytes of memory, one dual-sided diskette drive, a diskette adapter and a combination adapter. The combination adapter offers a programmable asynchronous communications port, a parallel interface port for printer attachment, a battery-backed clock and a thermal sensor interface.

The 5531 Model 011 costs approximately $3,725, depending on the dealer, and will be available in the second quarter of 1985.

The 7534 Industrial Graphics Display can be attached to the IBM Industrial Computer using either an IBM Enhanced Graphics Adapter, which costs $524, or the IBM Color/Graphics Monitor Adapter, which costs $244. When combined with the IBM Enhanced Graphics Adapter, it provides 640- by 350-pixel definition and can use four of 64 colors at a time.

The 7534 display — available in the third quarter of 1985 — will cost approximately $1,175, depending on the dealer, without either adapter board.

More information is available from IBM Manufacturing Systems Products, P. O. Box 1328, Boca Raton, Fla. 33432.

Tecmar offers drive/tape unit

SOLON, Ohio — Tecmar, Inc. has announced a combination hard disk drive and tape backup unit for the IBM Personal Computer, Personal Computer XT and AT. The QIC-60W20 is said to provide 60M bytes of tape backup and a 20M-byte Winchester hard disk drive.

The product reportedly contains a three-head tape deck and provides immediate read-after-write verification of data. A built-in power sensor is said to sense power reductions in the micro to protect the heads from writing on data during power interruption.

The system is said to provide menu-driven commands to lead the user through backup operations, including the restoration of lost information on a hard disk.

The QIC-60W20 costs $3,495.

Tecmar is headquartered at 6225 Cochran Road, Solon, Ohio 44139.

IBM System 9003 for manufacturing out

RYE BROOK, N.Y. — IBM has introduced a version of its System 9000 microcomputer for use in manufacturing and process control applications. The 9003 industrial computer reportedly can operate in a stand-alone environment or link with a host under IBM's Systems Network Architecture.

Based on the Motorola, Inc. 68000 processor, the 9003 reportedly can control up to 64 tasks concurrently and support up to 5M bytes of memory and up to 40M bytes of on-line storage.

It uses the CSOS operating system embedded in read-only memory. Microsoft Corp.'s Xenix multiuser operating system is offered as an option. Also optional are Basic, C, Fortran 77 and Pascal languages and software to support windowing.

The 9003's 66-in.-high cabinet includes a closed-loop air-conditioner, reportedly enabling the unit to operate at room temperatures of up to 125 degrees F. A battery-operated backup power source is optional.

Both a pressure-sensitive keypad and a typewriter-style keyboard are included. According to a vendor spokesman, the keypad's 57 keys can be programmed to perform several operations, reducing the need for operator interventions.

Five expansion slots available

Five expansion slots are available on the 9300's chassis, and memory is said to be expandable to up to 1M byte for each feature board inserted. Optional disk storage includes the choice of 5¼- or 8-in. diskette drives or a 5¼-in. built-in hard disk.

The 9003 will be available this quarter and costs $21,130 in its basic configuration of 128K bytes of memory and one 5¼-in., 640K-byte diskette drive or one 8-in., 985K-byte diskette drive.

For more information on this system contact IBM's Information Systems Group which is located at 900 King St., Rye Brook, N.Y. 10573.



CONFI

The #1 3270 alternative for people who need a name they can trust.

Sooner or later, the search for truly compatible low-cost 3270 terminals, better service and product flexibility comes to a question of confidence. And nobody answers the question better than Telex.

Who is Telex? The #1 supplier of 3270 alternatives. Next to IBM, nobody sells more 3270 displays, printers, controllers and intelligent workstations than Telex.

Why Telex? Because Telex terminals are a lot more than just 3270 plug compatible. Product for product, they offer

MICROCOMPUTERS

SOFTWARE

■ **Micro-Software Developers, Inc., has announced the C Debugger for creating C programs with the Lattice, Inc. C compiler on the IBM Personal Computer.**

The C Debugger is said to support all four Lattice memory models and to recognize atuomatically the type being used. It produces a high-level view of C programs and a low-level view of machine addresses and instructions for testing assembler language functions.

The product allows the C source for the program being debugged to be executed one line at a time or in multiple lines, according to the vendor.

The C Debugger requires 256K bytes of main memory and IBM's PC-DOS Version 2.0 or higher.

The package is priced at $165 plus $3.50 for shipping and handling.

Micro-Software Developers, 214½ W. Main St., St. Charles, Ill. 60174.

■ **Syscomp has announced DB III Export, program conversion software that translates worksheet files from Lotus Development Corp.'s 1-2-3 or Symphony to Ashton-Tate Dbase III data base files.**

The product runs on the IBM Personal Computer, Personal Computer XT or AT running IBM's PC-DOS Version 2.0 or higher.

DB III Export reportedly can create a new data base file from specified spreadsheet data or append worksheet data to an existing data base file. Data base size is said to be limited only by disk size.

The product costs $75 and is available bundled with Syscomp's DB III Import for $125.

Syscomp, Suite 210, 8825 Aero Drive, San Diego, Calif. 92123.

■ **Powerbase Systems, Inc. has released an enhanced version of its Power-Base data base management system for IBM microcomputers.**

Release 2.1 of Power-Base is said to be compatible with IBM's Topview software and provide a data transfer link to and from Lotus Development Corp.'s Symphony.

Other features include foreign language support, password protection and improved performance response time.

Version 2.1 of Power-Base requires 320K bytes of memory and does not support DOS 1.0/1.1.

The product costs $595.

Powerbase Systems, 12 W. 37th St., New York, N.Y. 10018.

■ **Thoughtware, Inc. has introduced Sell! Sell! Sell! software for sales training and analysis using the IBM Personal Computer and compatibles.**

The software consists of two components. The training portion reportedly evaluates sales attitudes and skills and guides the sales representative through selling exercises. The applications portion permits the user to monitor, plan, execute and analyze the sales process.

The software's training component costs $495 and requires a color graphics card. The applications component costs $195 and requires dual diskette drives.

Thoughtware, Suite 1000A, 2699 S. Bayshore Drive, Coconut Grove, Fla. 33133.

■ **Parameter Driven Software, Inc. has introduced PDS-Alert PC, a programming system for IBM Personal Computers.**

PDS-Alert PC reportedly is a fourth-generation programming system that requires no programming experience for use. Under the software, the Personal Computer's screen displays questions and choices, leading the operator through programming step by step.

The process is said to be self-documenting. Effects of changes are shown on the screen immediately.

PDS-Alert PC requires a Personal Computer or compatible with a 5M-byte or larger hard-disk unit and at least 512K bytes of memory.

It costs $795.

Parameter Driven Software, Suite 3820, 308000 Telegraph Road, Birmingham, Mich. 48010.

■ **International Electronic Machinery, Inc. (IEM) has announced Plot 77 software for the Hewlett-Packard Co. Series 200 desktop computer. Plot 77 is said to construct, scale and calibrate the axes of a graph for any array of coordinate data.**

The product is installed under HP Pascal and stored in Motorola, Inc. 68000 native code. It is said to be compatible with most HP HPIB and RS-232 plotting devices and with most raster graphics printers. Plot 77 reportedly supports HP Series 200 color monitors and various color plotters and can be called from IEM Fortran 77.

Plot 77 contains a library of 14 plotting subroutines, according to the vendor. It is reportedly available on 3½-, 5¼- or 8-in. disks.

Plot 77 costs $395.

IEM, P.O. Box 1889, Fort Collins, Colo. 80522.

■ **RTCS Corp. has released an enhanced version of PC/RTX, its operating system that implements the Intel Corp. IRMX86 Release 6 operating system configured for the IBM Personal Computer and Personal Computer XT.**

PC/RTX Version 4.1 is said to offer faster floppy-disk operation and to support the IBM Enhanced Graphics Adapter and special-function keys on the IBM keyboard. The product reportedly includes PC-DOS and PC/RTX configuration utilities for

Continued on page 50



extra features. So they're more than an alternative . . . they're an advantage. With cost efficiency only a high-volume manufacturer can offer.

And every Telex product is backed by over 2,000 Telex-dedicated service and support people worldwide.

What kind of company is Telex? Strong enough to have earned the confidence of a market that demands stability, dependability and innovation. That's why more and more companies are trusting Telex to be their #1 3270 supplier.

For more information, contact John Hawkins, 6422 E. 41st Street, Tulsa, OK 74135/1-800-331-2623.

The #1
3270 Alternative

TELEX®

TELEX COMPUTER PRODUCTS, INC.

MICROCOMPUTERS

Continued from page 49

the Personal Computer XT hard disk, utilities to transfer files between PC/RTX and PC-DOS disk formats and six Intel utilities.

PC/RTX Version 4.1 requires 512K bytes of memory and two 360K-byte disk drives or a 360K-byte drive and the Personal Computer XT hard disk. The product is available for $995.

RTCS, 1390 Flynn Road, Camarillo, Calif. 93010.

■ **Wallsoft Systems, Inc. has announced Dflow software that reportedly allows users of Ashton-Tate's Dbase II and Dbase III to debug programs by locating control statement errors.**

Dflow is said to illustrate program loops , IF/ELSE conditionals and case constructs. The package produces correctly indented program listings for individual files and applications systems.

Dflow runs on any Microsoft Corp. MS-DOS or IBM PC-DOS operating system running Dbase II or Dbase III, such as the IBM Personal Computer, Personal Computer XT or AT. The product costs $129.

Wallsoft Systems, Suite 869, 233 Broadway, New York, N.Y. 10279.

SYSTEMS

■ **Micro Five Corp. has unwrapped two new members of its 16-bit Series 1000 multiuser computer family.**

Both feature a 1M-byte diskette drive, 256K bytes to 768K bytes of main memory, from four to 20 I/O ports and a 60M-byte high-speed streaming tape system for backup.

The Turbo 1000 model T-1700 is said to feature 72M bytes of hard disk storage, and the Turbo 1000 model T-1800 is said to feature 140M bytes of hard disk storage.

Software systems for the models include Science Management Corp.'s Business Basic operating system or Micro Five's Stardos operating system.

The T-1700 costs $17,995 and the T-1800 costs $22,495.

Micro Five, P. O. Box 5011, 3560 Hyland Ave., Costa Mesa, Calif. 92626.

COMMUNICATIONS

■ **Comark, Inc. has introduced Twinax PC Board for terminal emulation on IBM Personal Computers running under IBM's PC-DOS 2.0 and up.**

The board reportedly provides emulation of local IBM 5291, 5292 and Model 11 terminals and allows any Personal Computer-compatible printer, with the capability to output graphics or compress printing, to emulate IBM's 5256, 5224 and 5225 dot matrix printers.

The package costs $895.

Comark, 135 N. Brandon Drive, Glendale Heights, Ill. 60139.

■ **Pathway Design, Inc. has announced the enhancement of its Pcpath communications software for IBM Personal Computers in the IBM Systems Network Architecture/Synchronous Data Link Control networking environment.**

Pcpath Release 2.2 now offers a command shell that accommodates high-level interfacing for local applications. Using Pcpath, a Personal Computer application written in a high-level language gains direct access to Pcpath's communications services.

Pcpath's command shell manages the interfacing of local applications to the lower programmatic interfaces built into the emulation software. Pcpath costs $295.

Pathway Design, 177 Worcester St., Wellesley, Mass. 02181.

■ **Dpex, Inc. has introduced MAC/3000, software that reportedly allows the Apple Computer, Inc. Macintosh to emulate a Hewlett-Packard Co. 2624A smart terminal.**

All major functions of the HP 2624A terminal are said to be supported. Also included are upward and downward file transfers, local editing using any Macintosh word processing or text editing package and printing with the Apple Imagewriter and Laserwriter printers.

The emulation software also reportedly supports both conversational and block modes.

MAC/3000 costs $169.

Dpex, Suite One, 240 Pamela Drive, Mountain View, Calif. 94040.

■ **Integrated Network Systems, Inc. has introduced its SDLC Loop PC Adapter for the IBM Personal Computer line.**

The adapter reportedly enables documents, data or programs to be distributed for processing throughout the IBM 8100 network. It offers single-key switching between a Personal Computer session and either of two IBM 3278/3279 emulation sessions.

According to the vendor, through the use of a menu-driven configuration program, the adapter also reportedly permits a Personal Computer to be more easily integrated in the 8100 network.

The adapter costs $1,275.

Integrated Network Systems, P.O. Box 91393, Mobile, Ala. 36691.

■ **Software Synergy, Inc. has announced Respond/TTY communications software that is said to link IBM's Personal Computer, Portable Personal Computer, Personal Computer AT or XT to minis and other micros by emulating a teletypewriter terminal.**

Series II + TWINAX Converter

The Direct Approach To Systems 34/36/38 Communications



A TRULY TWINAXIAL PROTOCOL CONVERTER

The direct approach to IBM Systems 34/36/38 communications is through the KMW Series II + Twinax. You don't need expensive communications adaptors or complicated indirect schemes to attach ASCII printers and CRTs to Systems 34/36/38 computers. Using standard twinaxial cable, the Twinax Converter attaches *directly* to the System 34/36/38 providing local or remote communications for up to 7 parallel or asynchronous serial devices.

TWINAX Pluses

+ Device Support

The Twinax Converter provides support for most popular ASCII printers or CRTs including high-performance, low-cost printers, plotters, terminals and PCs. Printers appear to the host as IBM 5225, 5224 and 5256 printers while ASCII RS-232-C full screen and hardcopy terminals appear as IBM 5291 or as 5251 Model 1 or 11 display stations.

+ Programmability

The Twinax user can set or change many of the converter's operating parameters using an asynchronous ASCII terminal. Each serial port may be independently software configured for data rates up to 19.2Kbps, stop-bits, parity and X-ON/X-OFF or CTS flow control.

+ Diagnostics

The Series II + Twinax Converter provides three levels of extensive on-board diagnostics for troubleshooting by customer or KMW personnel.

+ Hardware Design

The Series II + Twinax's efficient hardware design provides for maximum flexibility, a high degree of reliability and ease of maintenance.

Take the direct approach to Systems 34/36/38 communications. Go directly to the Series II + Twinax Converter.

KMW SYSTEMS CORPORATION

8307 Highway 71 West • Austin, Texas 78735 • 512/288-1453 • TWX: 910-874-2005 CABLE: KMWSYS AUS

Call Toll Free 800/531-5167

MICROCOMPUTERS

Data transfer features reportedly include the Xmodem protocol for error checking to ensure accurate data transmission and capture. The software is said to transfer both text and binary data, allow users to run other programs simultaneously and download or channel data into spreadsheets, word processing or data base files.

Respond/TTY requires 256K bytes of memory, IBM's PC-DOS version 2.0 or higher, one double-sided diskette drive, a monochrome or 80-col. color monitor, an AT&T-compatible internal or external modem and an asynchronous I/O board with appropriate cabling.

The product is priced at $125.

Software Synergy, 466 Main St., New Rochelle, N.Y. 10801.

■ Phoenix Computer Products Corp. has announced Ptel, binary file transfer software for microcomputers running the Microsoft Corp. MS-DOS operating system versions 2.0 and higher.

Ptel users reportedly can transfer binary and Ascii files to other users in a network, upload and download files from electronic bulletin boards and move files between different operating systems and machines. Ptel operates in VT102 terminal emulation mode and utilizes Phoenix's Telink binary protocol to change block size during data transmission, according to the vendor.

The product reportedly handles transmission speeds of up to 9.6K bit/sec. and can operate in originate and answer mode. It requires 90K bytes of memory and runs on the IBM Personal Computer, Personal Computer XT and AT, Digital Equipment Corp. Rainbow and other MS-DOS machines.

Ptel sells for $195.

Phoenix Computer Products, Suite 220, 1416 Providence Highway, Norwood, Mass. 02062.

■ Telexpress, Inc. has introduced a version of its Teleterm X communications package for the Tandy Corp. 16/6000 personal computer under Microsoft Corp.'s Xenix multiuser operating system.

Teleterm X reportedly supports a variety of modem types and allows users to define their own modem type. It is compatible with any system running Teleterm EM software and operates with most protocol converters for synchronous communications, the vendor said.

The software reportedly supports error-free, disk-to-disk file transfer and supports the X Modem protocol. It also permits file uploads and downloads with any asynchronous system, microcomputer or mainframe.

The product costs $395.

Telexpress, P.O. Box 217, Willingboro, N.J. 08046.

STORAGE DEVICES

■ Cipher Data Products, Inc. has announced that its 25M-byte Model 5210 tape backup system is available to support the Texas Instruments, Inc. Professional Computer.

The system is based on the vendor's Floppy Tape technology that enables tape drives to emulate the standard floppy disk interface and permits them to respond to floppy disk-like commands, according to Cipher Data.

The Model 5210-TI is priced at $1,095.

Cipher Data Products, P.O. Box 85170, 10101 Old Grove Road, San Diego, Calif. 92138.

■ Kamerman Labs has announced 10M-byte and 60M-byte streaming tape backup units for use with the IBM Personal Computer, Personal Computer XT and AT.

Continued on page 52

FOX from page 47

macro "learn" facility that stores keystrokes.

The learn facility also is available separately as the Keymac package. Unlike other macro programs such as Borland International's Sidekey, Keymac is specifically designed for 1-2-3 applications, Fox said.

The products run on the IBM Personal Computer line and compatible systems. Quickmac requires 70K bytes of internal memory space.

Quickmac will be available in June for $99 or can be ordered now for $79. Keymac will ship in May for $49.

Fox & Geller is located at 604 Market St., Elmwood Park, N.J. 07407.

DEBUTS from page 47

the screen.

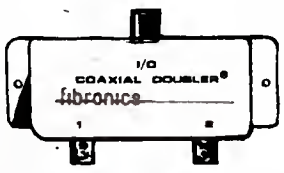
The word processing package, R Word, is said to include a 50,000-word spelling checker. R Word also includes a printer setup program for printer configuration. R Word reportedly can create anything from a memo to a report and offers users a menu of editing, formatting and printing functions.

Also introduced was a multiuser version of R Desk, desktop management software that was recently enhanced with an on-screen clock and cross-system file compatibility. R Desk serves as an on-screen notepad, to-do list, daily scheduler and desktop calculator.

The multiuser version of R Desk is priced at $295. Single-user R Desk is $39.95.

R Word is $895 in its multiuser version and $295 in its single-user version. R Office costs $1,295 for multiuser versions, and $495 for single-user versions.

R Systems is located at 11450 Pagemill Road, Dallas, Texas 75243.



COAXIAL DOUBLER
Double the capacity of an existing coax cable. In just minutes, add a second IBM 3270 terminal or printer where one already exists. This module pair allows simultaneous data transmission of two peripherals over a single coaxial cable.



CXTP MODULE
Wherever phone lines exist, you can easily install an IBM peripheral. Simply attach a terminal or printer to a remote CXTP module and transmit data over twisted pair phone lines to a CXTP module at the controller site.





D&V MULTIPLEXER
Transmit simultaneous voice and data over existing telephone twisted pair wire with the quick installation of the D&V MULTIPLEXER. Add a terminal or printer wherever a phone exists without coax expense.*
*For all distance requirements and prices call Fibronics.

BUST THROUGH COAX EXPENSE

Now dramatically reduce costly coax cable requirements with compact, easy-to-install modules that require no external electrical power. Fibronics offers the DOUBLER, the CXTP MODULE (coax-to-twisted pair) and the D&V MULTIPLEXER (data and voice). All three modules are COMPATIBLE WITH ANY IBM® 3270 CATEGORY A DEVICE (or plug compatible).

Fibronics International Inc.

fiberoptic communications
325 Stevens Street
Hyannis, MA 02601
(617) 778-0700 Telex 951297

Don't let coax hassles keep you from installing the terminal or printer you need now. Install these compact modules yourself, quickly and inexpensively.
CALL FOR FREE INFORMATION: (617) 778-0700

IBM is a registered trademark of the International Business Machines Corporation

MICROCOMPUTERS

Continued from page 51

Each streaming tape cartridge is said to back up 10M bytes in less than four minutes. The tape units reportedly permit both image and file-by-file backup and restoration.

Communication between disk and tape is facilitated by a menu-driven program that allows the user to call up both tape and hard disk directories to back up, restore, erase, rename and print individual files, the vendor said.

The 10M-byte streamer tape backup is priced at $795; the 60M-byte model, $1,395.

Kamerman Labs, 8054 S.W. Nimbus Ave., Beaverton, Ore. 97005.

■ Advanced Digital Information Corp. has introduced a file-addressable tape cartridge backup system for networked IBM Personal Computers.

The Data Library tape system reportedly offers the capacity to store more than 30,000 IBM PC-DOS files and to emulate a hard disk, using all of the commands of Microsoft Corp.'s MS-DOS operating system.

The system also is said to permit users to store and retrieve data randomly without software modification.

Because it is file addressable, Data Library permits users to access data on a network, even after the network's hard disk has undergone a head crash, according to the vendor.

The Data Library interfaces with Novell, Inc. Netware software and costs $4,495.

Advanced Digital Information, P.O. Box 2996, Redmond, Wash. 98013.

■ Priam Corp. has introduced Innerspace, a 5¼-in. add-in disk drive for the IBM Personal Computer XT.

Designed as a replacement for the Personal Computer XT's standard 10M-byte disk, the Innerspace disk drive fits into the same space and reportedly offers either 43M bytes or 60M bytes of storage in its two versions. Both versions have an access time of approximately 30 msec.

The Innerspace unit consists of a complete add-in kit with installation software, manual and reference guide. It reportedly provides automatic defect management for data security and protects against accidental loss of data.

The 43M-byte Innerspace costs $2,195; the 60M-byte unit costs $2,595.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

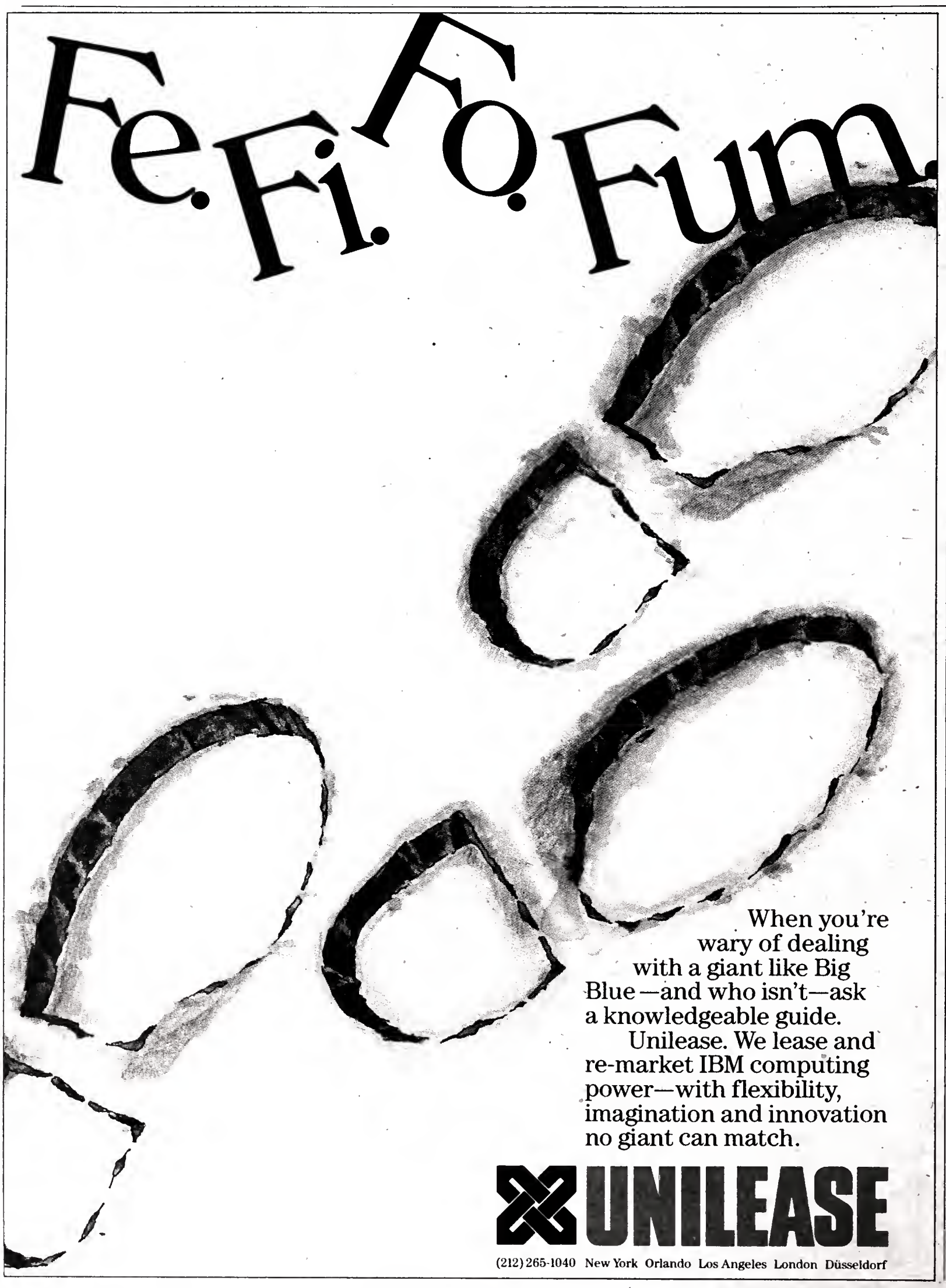
■ Portable Computer Support Group, Inc. has announced the Chipmunk portable disk drive for use with the Tandy Corp. Models 100 and 200 laptop computers.

The product is said to expand the computers' 32K-byte random-access memory with 358K bytes of storage per 3½-in. diskette. Users can reportedly save files on disk or call files from the disk with a single keystroke.

A diskette supplied with the disk drive includes functions that allow users to view segments of large files from a remote mainframe and directly upload or download files to and from the mainframe with a single keystroke, the vendor said.

The product costs $599.

Portable Computer Support Group, No. 207, 11035 Harry Hines Blvd., Dallas, Texas 75229.



NAME from page 47

will end up supporting.

But Compaq has staked out its turf much more clearly than did AT&T with its Unix PC, an intriguing system flung out toward the misty ranks of those who buy "next-generation" machines.

AT&T's plans for the Unix PC aren't clear — for one thing, if a full range of voice/data features is so important, why doesn't the Unix PC offer them for multiple users? For another, does the new Communications Manager add-on for the AT&T 6300 PC make that machine a fairly direct competitor of the Unix PC?

Closer to earth, the suppliers already offering personal computer/phone combos underline the need to expand the range of communications options and link them tightly to specific applications.

In one case, Zaisan, Inc. found that users wanted the ability to dial automatically a phone number displayed in IBM 3278 terminal emulation mode, noted Don Cooper, marketing vice-president at the Houston firm. Zaisan, which introduced its ES3 IBM Personal Computer-compatible system last July, has added read-only memory software to carry out the task.

Tangible benefits

But there are huge numbers of potential options — when do all the potential benefits become tangible?

For Bruce Berman, whose Boston-based Catalyst organization does political communications and fundraising, adding voice store-and-forward to a range of other telecommunications functions did the trick.

Berman bought Watson, an add-on product for the Personal Computer from Natural Microsystems Corp. of Natick, Mass., and found that the device "began to shape the way that I work."

"With one button, I can get in touch with any client," he said. Clients also can call in to pick up messages. In addition, the setup gives "closer contact with my employees who are not on-site without making them feel overmanaged," he said. "They like calling in."

He pointed out that the system can make calls by itself, sending recorded or voice-synthesized messages. Recorded messages work perfectly well in some situations, he said. "If you're delivering information to people that they want or need, they don't care."

COMMUNICATIONS

AT&T service offers up to 20% savings

By John Dix
CW Staff

Corporate users with private-line networks may be able to shave 10% to 20% off their communications bills using a recently announced AT&T service in which user networks exist in the memory of AT&T switches and links are established when and as needed.

Introduced in March [CW, March 11], AT&T's Software Defined Network (SDN) is an analog service for voice transmissions and data communications up to 9.6K bit/sec. SDN "enables users to put together a private network using AT&T switched facilities," said Joel Gross, product manager of the service. SDN is slated to be available later this month.

"Communications managers today can only manage the large sites in a network, and the hundreds and sometimes thousands of small locations go virtually unmanaged," Gross said. These small sites typically use direct-distance dialing and Wats lines because they do not have the traffic required to cost-justify a private line to tie into a corporate network, according to Gross.

"With SDN you can put almost every location on the corporate network and provide features and cost management and network management to each site," Gross said.

Targeted at business customers with at least 20 geographically dispersed corporate sites, SDN is said to provide functions similar to electronic tandem networks — where private branch exchanges are networked together using leased lines — and AT&T's Enhanced Private Switched Communications Service (EPSCS) and Common Control Switching Arrangement (CCSA) service, which are switched private-line services for large organizations.

Like these network alternatives, SDN provides for the following:

■ Seven- or 10-digit private numbering plans in which all users, regardless of location, can establish a connection through the corporate network using the company's numbering plan.

■ Call authorization codes that can be

See **SDN** page 59

ANALYSIS

SDN supplements private-line nets

By John Dix
CW Staff

Large corporations will use AT&T Communications' recently announced Software Defined Network (SDN) service to supplement private-line networks, but the fact that it is an analog service limits its use for data communications, consultants concurred.

"There will be a substantial amount of interest in [SDN], particularly in firms that really don't have a full corporate network but need a few private-line equivalents," according to Donald Dittberner, president of Dittberner Associates, a consulting firm in Bethesda, Md. "Unfortunately, it looks like AT&T is [initially] going to offer this with analog

See **LIMIT** page 60

■ Timeplex has announced an asynchronous port module for its Link/1 facilities management system for T1 transmission/**55**

■ Verilink has announced a channel service unit for T1 lines/**55**

■ Uninet will jointly produce, market and support private packet-switched networks with the telecommunications division of M/A-Com/**59**

■ Triangle Software released an enhanced version of its Netcheck CICS network management software/**59**

INSIDE

Voice/Data Communications/**55**

Software/**59**

Groups oppose FCC proposal for allotment

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — Two large user groups last week expressed their opposition to proposals being considered by the Federal Communications Commission to allocate customers who do not choose long-distance communications carriers among available service providers.

The International Communications Association (ICA) and the Ad Hoc Telecommunications Users Committee, which represents 30 large Fortune 100 firms, are opposing the default allocation plan that is supported by the U.S. Department of Justice [CW, April 22].

Under the current plan, customers who do not choose a long-distance carrier under equal access are defaulted to AT&T Communications. The plan being considered by the FCC would apportion these so-called default customers among AT&T's various competitors, according to the percentage of customers initially captured by each carrier. This plan has worked with success in Northwestern Bell territory and prompted the Justice Department to throw its weight behind the change in the interest of "encouraging consumer choice."

ICA last week told the FCC that while "it understands the FCC's dilemma in desiring to find a means to resolve what is in effect an inertia favoring AT&T's existing dominance, [the ICA] cannot endorse a solution which would result in the unilateral transfer of a customer from AT&T to another long-distance carrier without that user's affirmative prior approval."

ICA said the proposal blatantly contradicts the FCC's stated policy of minimum interference in the marketplace and infringes on the consumer's freedom of

See **ACCESS** page 58

Net wiring still an issue

DATA STREAM
John Dix
CW Senior Editor

Although many of the lower level nuts and bolts issues of local networking have been superceded in users' minds with higher level software concerns, wiring and choice of media remain important technical and cost issues.

The options haven't changed much over the years. Twisted-pair wire, as used with telephone systems, is ubiquitous today, but it is rarely used for data communications. Coaxial cable, originally developed 50 years ago, is the most widely used data communications medium for corporatewide local networks and, more important, existing host-peripheral connections. Fiber optics is still in its infancy.

New on the scene is shielded twisted-pair wire. As flexible as telephone wire but a little more bulky, shielded twisted-pair wire can sustain higher data rates at greater distances than normal telephone wire. IBM uses two shielded twisted-pair wires in its Cabling System wiring scheme for data transport. That system also contains four regular twisted-pair wires for voice system support.

There are advantages and disadvantages with each type of wire and cable. The highest data rates, for example, can

See **WIRE** page 55

IBM management tools advanced but not perfect

By John Dix
CW Staff

BOSTON — "IBM is five or more years ahead of the rest of the world in software network managment," according to John King, executive director of James Martin Associates, a consulting firm in Carmel, Calif.

King taught a seminar on IBM Systems Network Architecture (SNA) network management at the Network Management and Technical Control conference held here recently. In the class, King outlined IBM's recommended structure for Network Control Centers, described some of IBM's network management tools and addressed areas where those IBM products need improvement.

IBM is putting together an edifice of network management software that will resemble other software edifices it already has in place, King said. Like SNA, "we will have to live with this for the next 20 years," he said. The International Standards Organization (ISO) once looked at network management but, accord-

See **KING** page 54

Stand-alone Phonemail available from Rolm

SANTA CLARA, Calif. — In back-to-back announcements, Rolm Corp. unveiled a version of its Phonemail messaging system for non-Rolm switches, and parent company IBM reported it will market the product in the U.S. and Canada.

The Rolm Phonemail voice store-and-forward system can reportedly be used with private branch exchanges manufactured by other switch vendors or with Centrex services provided by local telephone companies.

Originally designed to be integrated with Rolm's family of switches, the Phonemail version lacks some features available when integrated with Rolm CBX II systems. In particular, the stand-alone version cannot support a call-waiting light, and users have to forward their phones manually to their mailboxes instead of having incoming calls automatically routed there after four unanswered rings.

As with the integrated version, Phonemail for non-Rolm switches comes in four-, eight- or 16-channel

See **ROLM** page 55

KING from page 53

ing to King, abandoned the effort after two years. ISO's network reference model will borrow network management technology from IBM's architecture, the speaker predicted.

Drawing from IBM documentation, King said the mainframe manufacturer recommends a three-tiered Network Control Center as the nerve center for network management. These levels include a help desk, network operations and technical support.

According to King, the first level, the user help desk, can resolve 85% of network problems that generally involve things like making sure the user device is turned on. Operations support resolves 10% of net failures, including link and modem problems. The remaining 5% of the problems are software-related and require technical support.

IBM's network management tools revolve around centralized, host-based applications software, King said. The Network Communications Control Facility (NCCF) is the baseline application that runs on Vtam on the host. Other applications, such as the Network Problem Determination Application and the Network Logical Data Manager, run on top of NCCF.

These and other packages provide end-to-end management capabilities, if IBM or compatible modems and peripherals are used. "Modems are a very strategic IBM network management product," King said. IBM uses mainstream or in-band signaling for network management — where status data of remote equipment is intermixed with the main data stream — while most other vendors pass that data over a separate side or out-of-band channel.

Although "overpriced and underpowered," IBM modem technology will eventually dominate because of IBM's lead in software-based network management, King said. NCR Comten, Inc. already makes IBM-compatible modems.

But as advanced as IBM's host-based software management tools are, problems exist. King said IBM needs to do the following:

- Reduce network complexity, particularly when developing systems generations that define the location and type of equipment in a network. Today users have to "gen" the host and the front-end processor separately using different equipment descriptions.
- Extend connectivity of SNA host network management applications to local networks — including personal computer nets — and separate the job of network operator into separate positions for CPU room operator and network operator.
- Increase application availability by improving network routing alternatives and recovery procedures.
- Provide for nondisruptive network growth where systems can be attached to the network and be recognized as new devices without having to stop everything to do a new systems generation.

Network management is being driven today by the ever-increasing need for continual network service with acceptable response times at reasonable costs, King said. Although these goals will remain constant in the future, networks and network management systems will have to change with the times, particularly to support personal computers.

Honeywell expands Ethernet server lines

PHOENIX — Honeywell, Inc. has announced a network control server, the NCS/150, and several diskless communications servers for its Ethernet local-area network products.

Honeywell's local net products are compatible with Ethernet Version 1.0 and IEEE 802.3 standards, according to the vendor. They support the Xerox Network System protocols and Honeywell's Distributed Systems Architecture for its DPS 90, DPS 88 and DPS 8 large-scale processors, as well as its DPS 6 small systems and Microsystems 6/10 and 6/20.

The NCS/150 is said to centralize administration of a local network and provide initial loading of operating system software. The NCS/150 supports up to 40 communications servers with or without disks. Multiple NCS/150s can be integrated into a single Honeywell Ethernet network to support a larger number of servers or to provide redundancy.

Honeywell's CS/1 series has been expanded with the diskless CS/1-X, which provides the same functions and supports the same number and types of devices as the CS/1.

Software for the CS/1-X is loaded from an NCS/150 over the network. Software for the CS/1 can be loaded from its own diskette or from an NCS/150 over the network.

Seven models have been added to the CS/100 series, four of which are diskless. Honeywell's communications servers support from four to 14 synchronous or asynchronous terminals. The disk CS/100 products can be loaded from the terminals or from the network control server over the network. The diskless CS/100 products support servers in environments where operator intervention is not practical or where a floppy disk drive is subject to contamination.

The NCS/150 communications server costs $6,195. The diskless CS/1-X, which can be configured with up to 32 ports, costs $8,085. Prices in the CS/100 series range from $3,780 to $5,670.

Honeywell can be reached at P.O Box 8000/A-79, Phoenix, Ariz. 85066.

HOW TO SURVIVE TOO MUCH OF A GOOD THING.

If you're having trouble getting your bearings in the new long distance environment — relax. There's a way out.

ROLM to the rescue.

ROLM has new technology you can grow with, phone bills you can live with.

Only ROLM has perfected a gee whiz feature called Integrated Call Management,™ blended it into the ROLM® CBX II business communication system.

It can shop dozens of competing long distance services.

It can zero in on the cheapest long distance route automatically, instantly. So you can take advantage of volume discounts or time-of-day savings on every single call.

You're not limited to just one carrier. There are no equal access penalty charges or delays for changing services. And because CBX II watchdogs every call — like the zillions of per-

4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 9505

VOICE/DATA COMMUNICATIONS

■ **Timeplex, Inc. has announced an asynchronous port module for its Link/1 Facilities Management System for T1 transmission.**

According to a vendor spokesman, the Link/1 Quad Asynchronous Module (QAM) allows Link/1 units to handle an intermix of voice and synchronous and asynchronous data. It supports up to four asynchronous ports at rates up to 19.2K bit/sec.

QAM permits a single point of control over asynchronous devices connected to Link/1 units. In hierarchical systems, network control of the asynchronous ports requires separate supervisory port control of the multiplexing devices.

Interfaces available with QAM include RS-232/CCITT V.24, RS-422/CCITT V.11, RS-423/CCITT V.10 and MIL-STD-188-144 unbalanced.

QAM costs $1,750.

Timeplex, 400 Chestnut Ridge Road, Woodcliff Lake, N.H. 07675.

■ **Verilink Corp. has announced its 551V List 6 CSU, a channel service unit for T1 lines.**

The product reportedly monitors T1 traffic and can perform loopback signals for problem isolation and troubleshooting. A vendor spokesman said the channel service unit features single-end fault location capability, full jack access to a line and data terminal equipment (DTE) and the removal of bipolar violations incoming from the DTE.

The loopback capabilities consist

Continued on page 59

WIRE from page 53

be supported with fiber optics, but the glass strands are expensive and still hard to tap and split.

Coaxial cable — used in either broadband CATV-type applications or baseband Ethernet-type implementations — supports high data rates but is costly and inflexible.

Shielded twisted-pair wire — which is reportedly adequate for multiple megabit data support — is limited in application.

Rewiring

Regardless of capability, all of these media require that buildings be rewired. This costly and disruptive fact is cited by manufacturers of modern private branch exchanges which are peddling their products as office communications hubs. "Install our PBX," they say, "and capitalize on your existing telephone wiring to support terminals and personal computers."

Still other vendors push products that enable you to send a data signal through twisted-pair wire above the frequencies used for the voice signal.

Using existing twisted-pair wiring is appealing, but care should be taken that desired error rates can be attained. Traditionally, telephone wire has been installed haphazardly, changed randomly and poorly documented.

Lines, for example, may be spliced, branched or left with stubs running nowhere that cause problems like reflection, which can wreak havoc with data communications.

Existing telephone wiring is not the answer for mainstream data communications needs. So, faced with the need to provide communications support to a growing number of data devices, the user can, among other things, try to make do with existing systems by adding point-to-point, host-to-peripheral coaxial cable links (if risers and cable trays are not already filled); take up the overflow by supporting some terminals and personal computers with the PBX; install departmental local networks and gateways to connect them to the necessary host facilities; or rip out all the existing systems and install a flexible, standardized wiring system or local network.

If the wiring mess has become intolerable, the last choice might make sense, but then the question becomes: What do you use to rewire?

Three-tiered transition

Fiber optics is probably the best bet for the long term, but it is still too early to make that kind of choice. In fact, some consultants warn that the migration to the preferable office communications medium may not be a single transition but a three-tiered transition from the systems in place today to an interim fix and finally to something like fiber optics.

Because the cost of the transition is so high, some large companies constructing new buildings are trying to cover their bases.

One firm in New York is installing an IBM Cabling System that supports terminals and personal computers with shielded twisted-pair wiring; an AT&T System 85 PBX that can use the IBM Cabling System's unshielded twisted-pair wiring for terminal support; and a coaxial cable backbone that will initially be used to connect on-premise teleconferencing facilities, but which doubtlessly can be employed otherwise in the future.

ROLM from page 53

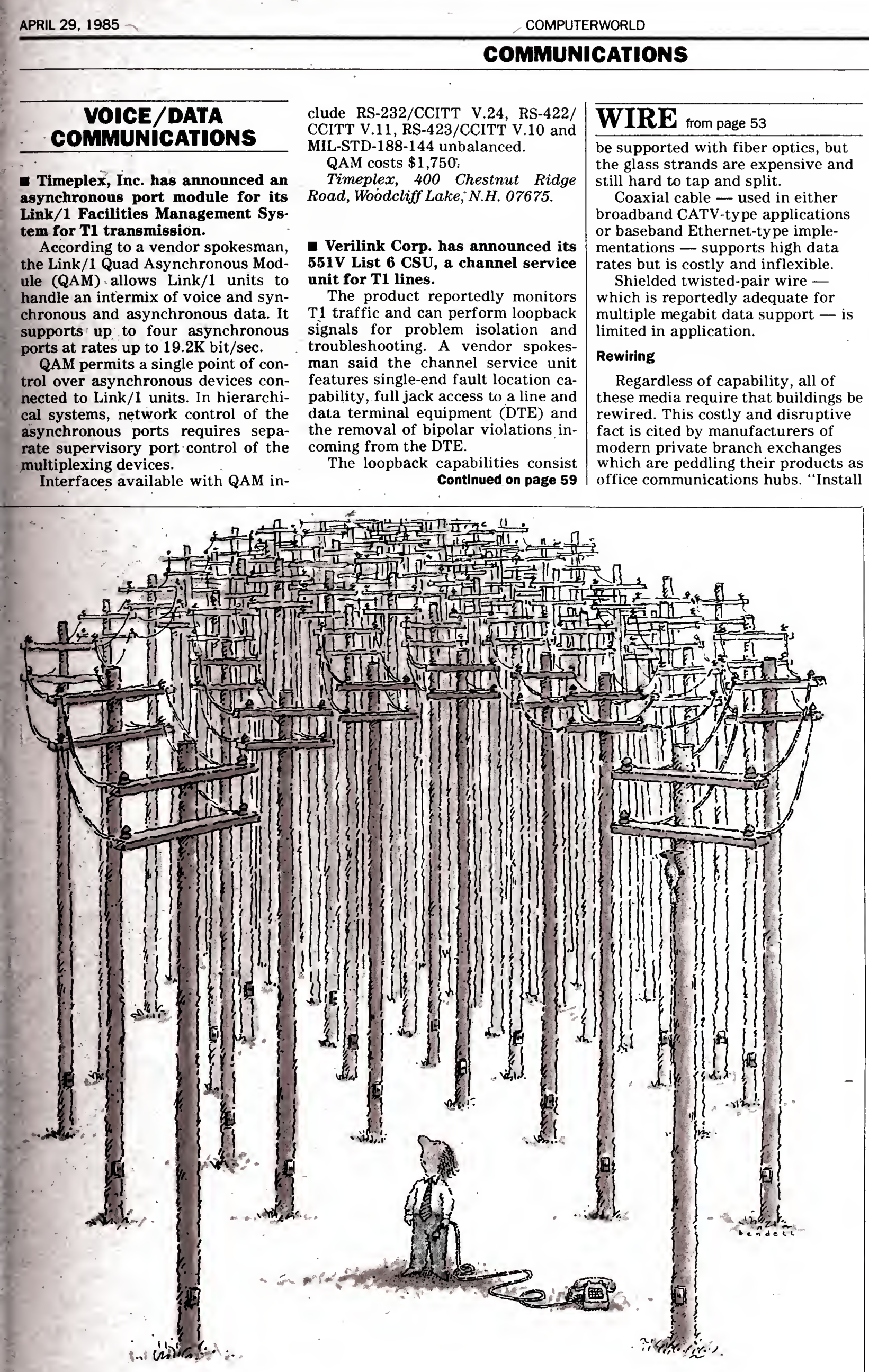
models. Users can store personal greetings and retrieve messages from any Touch-Tone telephone.

IBM said it will adopt Phonemail as its voice messaging product and discontinue its Audio Distribution System (ADS) in the U.S. and Canada. IBM reported it will provide central service support for ADS through 1986.

Prices for the four-port Phonemail system start at $67,000.

Rolm is located at 4900 Old Ironside Drive, Santa Clara, Calif. 95054.

IBM's Information Systems Group can be reached at 900 King St., Rye Brook, N.Y. 10573.



sonal calls that can squash the company kitty —you can keep track of bills and chargebacks.

Call us.

We'll break down your current phone bills. We'll recommend the stingiest carriers. (After all, we built our name managing call costs.) We'll dazzle you with the power of CBX II, the wizardry of advanced routing, the thrill of nationwide service and support.

Not surprising.

We're the folks who taught phones and computers and people to work together on one system. Today, next year and into the next century.

Let's talk. Remember, you're not out of the woods, yet.

ROLM
an IBM company

800-538-8154. (In Alaska, California and Hawaii, call 408-986-3025.)

Sooner or later, you'll have to face this computer problem.

PC MAGAZINE • MAY 15, 1984

Do your eyes itch, burn, or tear? Are they tired and sore? Do you get headaches, occasional dizziness, or blurred or double vision? If you have any of these symptoms, you're probably suffering from eyestrain and fatigue, and it may be from using your PC.

Eye fatigue and other vision problems are common for regular users of PCs and other kinds of video computer displays. This visual stress can also contribute to general tension and tiredness. Fortunately, [illegible] lems experienced by video display users ha[illegible]

Better sooner.

Better Sooner.

Computers don't ever get headaches.

But the people who use computers do.

Quite clearly, as PC Magazine spells out, that's not the only trouble they're having.

In case you're tempted to dismiss this as trivial, there are two things you should be aware of:

First, more than twenty states are already preparing legislation to force some improvements.

Second, if computer users suffer, so does business.

Because computers are only as fast and accurate as the people who operate them.

You are not a machine.

Computers are designed by engineers.

They usually know a lot about technology but very little about people.

Which is why so many computers are technically impressive but strangely unnatural to use.

Eye strain	55%
Back pain	43%
Headaches	30%
Shoulder	25%
Hand/wrist	18%
Neck pain	15%

(Source: "Ergonomic Principles in Office Automation" Pub. 1983 by E.I.S. AB, Sweden.)

Ericsson, in its very Swedish way, has always believed that excellent ergonomic design isn't a privilege.

It's a right.

That it isn't a noble gesture but demonstrably good for business.

It's an attitude that has made Ericsson No. 1 in Europe twice over:

First, as the giant of European telecommunications.

Then again as Europe's biggest workstation company by far.

(You couldn't ask for a better marriage of technology for the future.)

Here is one example of how they got there.

It's the first of a whole range of computers to be introduced in the U.S.A.

IBM is a trademark of International Business Machines Corp.

The Ericsson PC. It's Ergo-Intelligent.™

Ericsson has spent $300 million finding ways to make people and computers work better together.

Here are some of the results.

Ergo-Screen.™

Aspirin gets rid of a headache.

Ergonomics gets rid of the cause.

The Ericsson PC monitor has a non-glare screen.

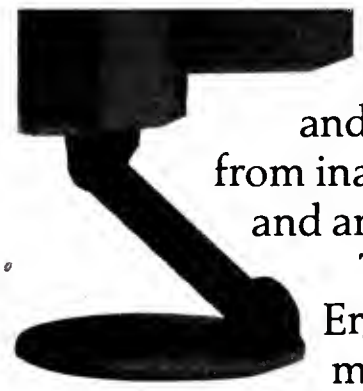
With restful amber characters on a specially developed, low-fatigue background color.

Even the shape of the actual characters was specially developed to allow easier recognition of difficult to distinguish letters like O and Q.

On the monochrome monitor, the resolution is double that of IBM's, so clarity is remarkable.

You can even have characters and graphics on the same screen.

Ergo-Arm.™



Thousands of people get neck and muscle pain from inadequate height and angle adjustment.

The Ericsson Ergo-Arm lets you move your screen exactly where you want it.

Better than back pain, wouldn't you agree?

Ergo-Touch.™

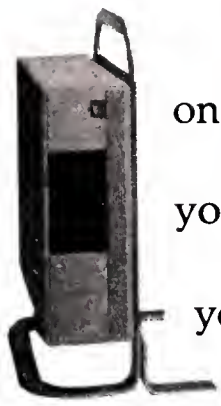
The keys are full-size and the layout is ergonomically planned for greater accuracy and speed.

Yet the keyboard is 20% more compact and less than half the weight of IBM's.

Even the cord is adjustable to suit left- or right-handers.

Ergo-Color.™

Even the color of the case is ergonomically selected to be restful to the eye over many hours.



Ergo-Space.™

The system unit is one-third smaller than IBM's.

It even fits under your desk in a vertical rack.

So your desktop is your own again.

IBM Compatible.

Many companies claim to be compatible.

Some are. Some are stretching the truth.

The Ericsson PC boasts the highest compatibility rating there is.

It's operationally compatible.

You can take advantage of thousands of PC-compatible programs already available.

In fact, with the best-selling software, the program and data disks are interchangeable with those of the IBM PC.

Service. Not Excuses.

Ericsson wouldn't give you anything less than on-site or carry-in service. The choice is yours.

3 Free Offers.

Ericsson will send you revealing literature on ergonomics.

Also a detailed brochure on the Ericsson PC.

And arrange a hands-on test if you ask for it.

Call toll-free 1-800-FOR-ERGO.



ERICSSON

ACCESS from page 53

choice. However, it does not look optimistic that the FCC will deflect the Justice Department's latest efforts, which, not unexpectedly, have emerged from frequent misgivings voiced by MCI Communications Corp. and GTE Sprint Communications Corp. on the equity of the divestiture's allocation formula.

ICA said that while equal-access conversion plans by the former Bell operating companies may lead to added marketing costs for AT&T's competitors — which face a geographically dispersed pattern of end-office conversion to equal access — ordering carrier allocation will prompt added revenue requirements for the other common carriers far beyond their arguable short-term benefit. ICA said these added costs, if all end offices are converted at the same time as advocated by Satellite Business Systems of McLean, Va., would then be passed on in rate hikes.

Beef about allocation scheme

The ICA, which represents telecommunications users who individually spend more than $1 million annually, has a further beef about the allocation scheme. Acknowledging that large- and medium-size business users will probably already have centralized telecommunications management, the ICA maintained that "process of ordering and billing local-access lines is frequently distributed among decentralized operating units . . . and many major corporations may operate much like a collection of small businesses at the local telephone level, without benefit of a national presubscription strategy."

Ad Hoc similarly based its opposition to a mandatory allocation scheme on the fact that "[mandatory allocation] could unreasonably intrude on the decisions of business and residence customers."

The group said lesser steps can be taken to improve the participation of consumers in the presubscription process. It noted complaints levied by Allnet Communication Services, Inc. against the divested Bell operating companies that allege delays in the provisioning of service, billing and collection problems and failure to deliver service on a timely basis.

For accurate communications revved up to 2400 bps, you need an expert in the driver's seat: DataComm 2412.

In the race for the fastest, most accurate communications here's a sure winner: the new DataComm 2412 full duplex dial-up modem.

The DataComm 2412 really knows the road. It transmits miles of information in record-breaking time. It speeds error-free data over switched networks at 2400 bps – twice as fast as 212 modems. And because transmission time is cut in half, it dramatically reduces phone costs.



At accelerated speeds, DataComm 2412 can access packet switching networks, graphics terminals, and remote databases. It can also link minis to a mainframe computer.

Features of the DataComm 2412 include: a 30-number auto dial, log on feature; an auto adaptive equalizer; and an optional plug-in ARQ module that automatically detects, corrects and assures error-free data.

To put your communications on a faster track, rev up to 2400 bps. With the new DataComm 2412. For information about this, or any of the other winners on the GDC team, contact our Sales Department, General DataComm, Inc., Middlebury, CT 06762-1299, (203) 574-1118.

General dataComm



General DataComm, Inc.
Middlebury, Connecticut
06762-1299
Telephone: (203) 574-1118

For more information, contact your GDC Sales Office.

U.S. BUSINESS USER SALES OFFICES
Atlanta, GA (404) 955-0682
Boston, MA (617) 366-3600
Chicago, IL (312) 298-4181
Dallas, TX (214) 980-0803
Detroit, MI (313) 540-4110
Santa Ana, CA (714) 957-0244
New York, NY (914) 946-7801
San Francisco, CA (415) 569-3115
Washington, DC (301) 596-0888

U.S. TELECOMM SALES OFFICES
Atlanta, GA (404) 956-1793
San Francisco, CA (415) 932-0703
Cherry Hill, NJ (609) 751-1047
Chicago, IL (312) 355-8840
Middletown, NY (914) 343-2882
Dallas, TX (214) 241-5383
Denver, CO (303) 972-8875
Yonkers, NY (914) 969-5162
St. Louis, MO (314) 256-0262

GENERAL DATACOMM INDUSTRIES (CANADA) LTD
Headquarters – Suite W410
2255 Sheppard Ave. East
Willowdale, Ontario
Canada M2J 4Y3
(416) 498-5100
TELEX: 06966619

Sales Offices –
Ottawa, Ont. (613) 741-8014
Montreal, Que. (514) 336-5454
Edmonton, Alta. (403) 483-4745
Vancouver (604) 430-5772

INTERNATIONAL SALES OFFICES
For the name of your distributor in the United Kingdom, Europe, Africa, and the Middle East, please contact:

General DataComm International
Molly Millars Close
Molly Millars Lane
Wokingham, Berkshire
England RG115QF
Telephone: 44-734-793600
Telex: 851-847298

For the name of your distributor in Asia, the Pacific, and Latin America, please contact: General DataComm International Corp., Middlebury, Connecticut 06762-1299
Telephone: (203) 574-1118

COMMUNICATIONS

SDN from page 53

used to charge departments for network use.

■ The establishment of call screening groups, where calling privileges for certain user segments can be regulated — restricting, for example, some users from making off-net calls, placing calls after 5 p.m. or making international calls.

■ Generation of reports that detail network use.

According to Gross, SDN provides these capabilities at savings of 10% to 20% when compared with electronic tandem networks and AT&T's EPSCS and CCSA services.

Users who network PBXs with leased lines might supplement these nets by using SDN to support small locations. Because customers have on-line access to their network, location support can be added, deleted or altered overnight and sometimes in as little as 15 minutes, Gross said. "You don't have to rewire anything."

SDN will initially be available from more than 600 AT&T serving offices around the country, Gross said. It is accessed through three types of communications facilities:

■ Standard SDN access, a new type of access that AT&T is asking the local exchange carriers to provide to end users. It is said to be a switched-dedicated access trunk similar to Wats; the facilities are switched but dedicated to use with SDN. Recommended data speeds supported with this type of access should not exceed 4.8K bit/sec.

■ Private-line access, procured by customers from a local carrier or through AT&T acting as the customer's agent, using voice-grade analog lines or digital facilities. Both accommodate speeds up to 9.6K bit/sec.

■ Customer-provided access, in which customers arrange access links with the carrier of their choice.

Making the choice

While accessing a switched service with a leased line seems analogous to putting the cart before the horse, choosing the type of access needed is simply a matter of finding the most cost-effective facility for each location's traffic. Small locations with low volume traffic would probably opt for SDN standard access, the most expensive type of access option, Gross said. Medium-size users might be able to cost-justify leased analog lines, which have fixed monthly rates. Large users may get the best price/performance by using T1 1.54M bit/sec digital facilities.

Once within SDN, AT&T routes the circuit according to instructions stored in the memory of its network switches. "There are no dedicated intermachine trunks," Gross explained. "The customer is being carried within a special domain within the switched network."

Beside the cost of accessing the SDN network, users are charged for the transport portion of the network from one SDN serving office to another. This charge is dependent on minutes of use, time of day and the distance between serving offices (see chart page 60).

Other network fees include a one-time, nonrecurring set-up charge of $105,000, which is payable in three installments. Additionally, there is a $1,000 access line grouping charge for each site supported up to 50 sites. The site-charge tapers off to $600 per site for 200 sites or more.

Continued from page 55

of data terminal equipment monitoring for the DTE side of a T1 line and data channel type and inband loopback capability for the network side. A 551V List 6 chassis fits either a 19- or 23-in. rack and can be adapted for mid- or front-chassis mounting.

The product costs $2,200.

Verilink, 1169 Borregas Ave., Sunnyvale, Calif. 94089.

■ United Telecommunications, Inc.'s Uninet, Inc. subsidiary has announced that it will jointly produce, market and support private packet-switched networks with the telecommunications division of M/A-Com, Inc.

Both companies will promote the private network offering, which is based on M/A-Com's CP-9000 Series II packet-switching equipment and Uninet's Gen4 proprietary software and hardware network products.

According to Uninet, orders for more than $40 million of Gen4/CP-9000 Series II products have already been placed. The agreement, the vendors said, combines Uninet's network operating experience with M/A-Com's technological expertise.

Uninet, 10951 Lakeview Ave., Lenexa, Kan. 66219.

SOFTWARE

■ Triangle Software Co. has released an enhanced version of its Netcheck CICS network management software. Version 2.0 is said to offer ad hoc and automatic message broadcasting, automatic attempts at reconnecting service and detailed reports of resources such as control units, lines and terminals for inventory purposes.

Netcheck 2.0 reportedly allows messages to be stored indefinitely for automatic broadcast to any group of terminals at a specified time. The product is said to allow users to specify a number of automatic attempts to reestablish service after disconnection and provide four hard-copy reports to track resource inventory.

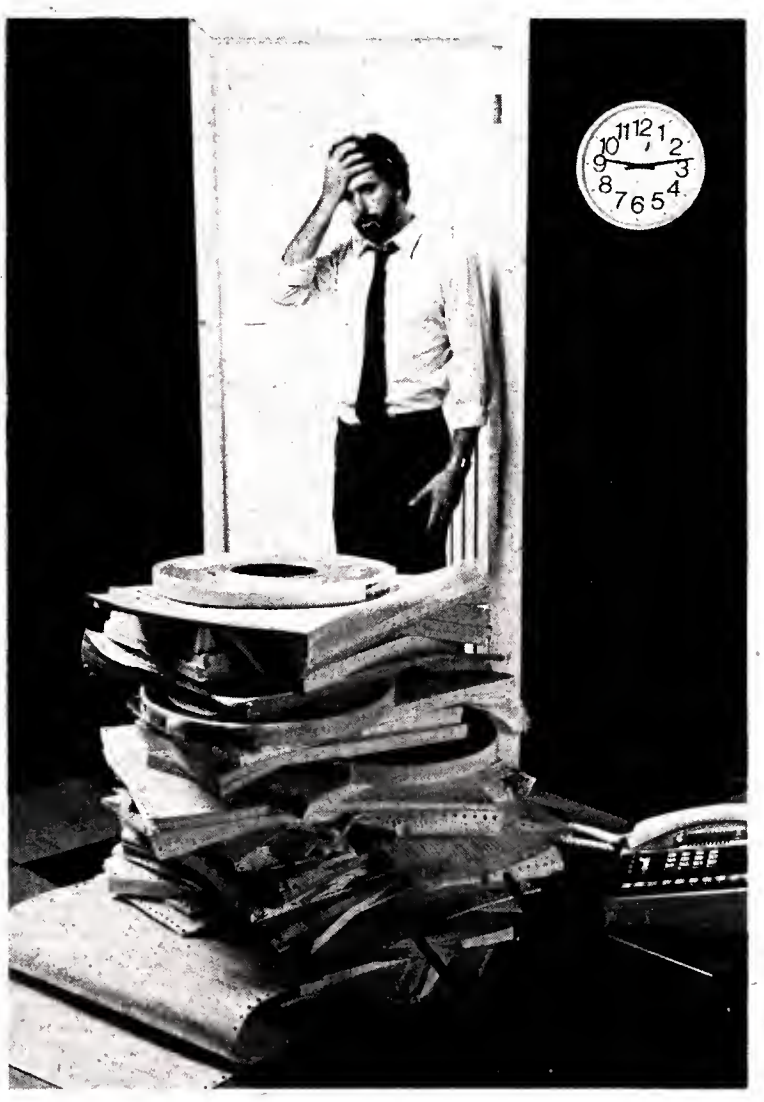
The product runs on any DOS or OS/VS system with CICS 1.5 or higher, according to the vendor.

Netcheck 2.0 costs $8,500 for DOS systems and $12,500 for OS/VS systems.

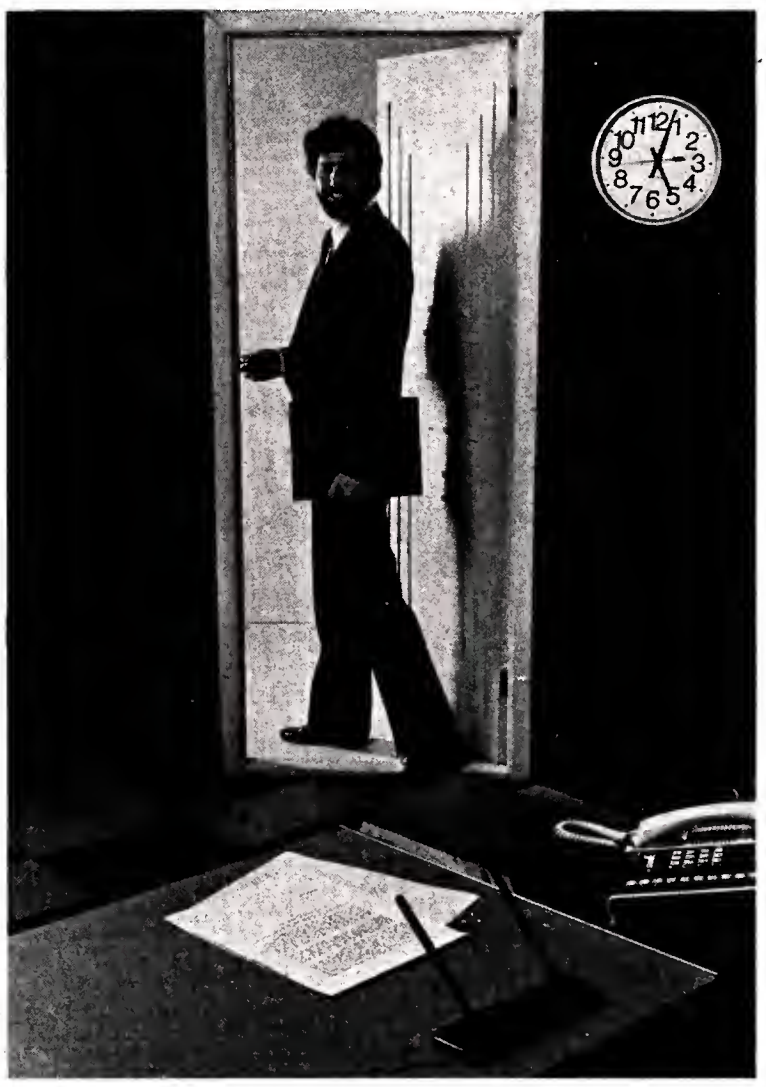
Triangle Software, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

CONSCO'S STATE-OF-THE-ARCHITECTURE FINANCIAL DATA MANAGEMENT SYSTEM.

IT HELPS YOU GET THROUGH A DAY LIKE THIS...



SO YOU CAN DO THIS.



You know the problem: the information needs of your company's financial managers can sometimes be overwhelming. To satisfy these needs, you must provide them with instant access to all financial data. In the format *they* want it in. And in the time frame they require. The answer: financial systems from Consco. User-oriented, mainframe computer systems with relational architecture that lets you introduce and track new data elements and set up your own edits any time, without software modification.

AIS: Accounting Information System

General Ledger plus everything else you wish you could do with your present system, but can't. A full-fledged, on-line information management system with no restriction on the number of fields or field sizes; full on-line, real-time capabilities for data entry and update; "system painting" features allowing on-line customization without software modification; edit tables incorporating full Boolean Logic and many more advanced features allowing integration and reporting on accounting data from your entire company, no matter how large or diversified. And providing your managers at all levels with the information they need to do their jobs more efficiently than ever before.

CONSOL: Consolidation System

The only consolidation system ever developed that actually automates the tedious tasks involved, such as reconciling intercompany accounts and producing management reports. CONSOL does it with a unique architecture which produces results up to 200 times faster than any other system, even when dealing with multiple hierarchies; changes to hierarchies without reprogramming or restating past data; or design and formatting of custom reports combining individual items from a variety of schedules and time periods, with multiple formats in single report. CONSOL is the only system that can automatically, quickly and efficiently deal with the complex SEC, IRS and FASB reporting requirements today's financial management demands.

Remember: for efficient financial data processing, you need more than state-of-the-art systems. You need state-of-the-architecture systems from Consco, the financial DP specialists. For details contact us at (201) 561-2111 or write to:

consco

400 Corporate Court, South Plainfield, NJ 07080

LIMIT from page 53

facilities, making it less attractive for large corporate network use," he said.

'Supplement to voice systems'

Billed as a voice and low-speed data network service, SDN is basically viewed as a "supplement to voice systems that have unpredictable peaks and valleys," according to Charles G. Abbott, a communications consultant in New York.

"Data is more controllable than voice because it can be held back, as compared with the uncontrollable, spontaneous, individually initiated voice call," Abbott said. With SDN, traffic peaks can be accommodated on an as-needed basis.

AT&T points out that SDN can be combined with its recently announced digital Accunet Switched 56 network service. "You can marry these services so it looks like a hybrid service," said Joel Gross, SDN product manager at AT&T. When used together, customers can specify that they want end-to-end digital connectivity, given that they have digital local-access facilities. When used together, the administrative functions of SDN — such as the use of authorization codes and call screening — can be applied to Accunet Switched 56.

The primary benefit of SDN is cost, consultants said. "SDN is a cross between a Wats line and a private line," according to Harry Newton, president of Telecom Library, a publishing and consulting firm in New York. "AT&T is trying to give users a switched network that looks like a private line." It gives users most of the functionality of private lines, but the traffic fill required to cost-justify dedicated facilities is unnecessary.

Another major benefit of the service is availability. Unlike a private line — where if the line goes down you have to wait until it is repaired — with SDN, alternate circuit paths can be established, Dittberner said.

On the dark side, Newton said, the technology behind SDN may eventually enable AT&T to do away with private lines, a proposition of which "large users are desperately afraid.

'AT&T is having difficulty'

"AT&T is having difficulty in providing private or special facility lines," Newton said. "It can't do it on a timely basis, and it can't cover its costs. AT&T's strategy is to try to get away from the price war and provide value-added services, such as SDN."

When and if the Federal Communications Commission ever deregulates AT&T — something the company pushes for regularly — it will instantly drop all private-line services, Newton contended.

"AT&T ultimately wants to get out of the private-line business," he said.

Likely motivators behind this strategy include the costs of installing dedicated facilities — costs that Newton said take too long to recover — and the imperative of maintenance; private lines require quick repair whereas switched services like SDN can bypass failed facilities.

Proposed Software Defined Network rates
(Business Day, Schedule A*)

Time Increments	Mileage Bands						
	0-292	293-430	431-925	926-1,910	1,911-3,000	3,001-4,250	4,251-5,750
First 30 sec./ additional 6 sec. increments	$.29/$.026	$.32/$.028	$.35/$.031	$.37/$.033	$.42/$.036	$.43/$.038	$.45/$.040
1 minute	$.42	$.46	$.51	$.54	$.60	$.62	$.65
2 minutes	$.68	$.74	$.82	$.87	$.96	$1.00	$1.05
3 minutes	$.94	$1.02	$1.13	$1.20	$1.32	$1.38	$1.45
4 minutes	$1.20	$1.30	$1.44	$1.53	$1.68	$1.76	$1.85

CW CHART

* Schedule A rates are the highest of the Software Defined Network (SDN) tariffs because they are end-to-end and include the cost of standard SDN local access.

Schedule B rates apply where SDN access is used on one end of a call and a leased special-access line is used on the other end. It also applies where special-access facilities are used to access the service and the switched telephone network is used to terminate the call.

Schedule C rates are the lowest tariffs and only cover the transport part of the network between AT&T SDN serving offices; customers have to procure their own local service access.

Nonbusiness day discounts include the following: Schedule A, 20%; Schedule B, 25%; and Schedule C, 30%.

VAX
Financial Software
COLLIER JACKSON, INC.
We bring software to life
813-872-9990
3707 West Cherry Street, Tampa, Florida 33607

LEARN CICS THIS SUMMER

COURSE	JUNE	JULY	AUG.
APPLICATION DESIGN	5/28–31 NY	7/22–25 CHI	
COMMAND LEVEL PROGRAMMING	6/10–14 NY 6/17–21 CHI	7/15–19 NY 7/22–25 DA	8/19–23 NY 8/10–11 & 7–8 NY
DEBUGGING		7/16–19 NY	
MACRO LEVEL PROGRAMMING	6/17–21 CHI		
INTERNAL ARCHITECTURE	6 24–28 CHI	7/8–12 NY	8/10–11 & 17–18 NY
PERFORMANCE DESIGN		7/1–2 NY	
RECOVERY & RESTART			8/26–27 NY

Not all CICS courses are alike. Only SysEd prepares reference manuals full of real life sample programs and case studies–the kind you'll need and use long after you've taken the course. Only SysEd has fully equipped Computer Labs where you'll spend hours in workshop sessions actually programming CICS on our 3081 computer using 3270's dedicated to the class. Classes are held in New York City, Chicago, Los Angeles and San Francisco. SysEd course offerings are also available for on-site sessions at company installations. On-site courses can include the same case studies and hands-on approach as our public courses, or can be customized to your particular application or project. So get smart this summer, call Steven Scott (212) 564-9147/48/49.

SYS-ED

35 WEST 35th ST., NEW YORK, N.Y. 10001 • (212) 564-9147/48/49

MIM85
A FIRST FOR THE SOFTWARE INDUSTRY

For the first time ever, anywhere, the collective genius that has brought about the worldwide software revolution will come together to sell product, share ideas and join forces in the international software marketplace.

The first international software marketplace.
More than 42 countries will be present to buy and sell.

The first international software import/export conference.
Internationally renowned specialists will lecture on software importing/exporting.

It all takes place June 3, 4 and 5, 1985 in Montreal, Canada for the world community of software producers, distributors and buyers.

MIM85 **Montreal International Software Market**
Tel (514) 288-8811
Telex 055-62495

in collaboration with CW COMMUNICATIONS/INC.
The world's leading publisher of computer related newspapers and magazines

MIM85 **Montreal International Software Market**
300 Léo-Pariseau, Suite 1919
P.O. Box 1119, Place du Parc
Montreal, Quebec, Canada H2W 2P4

Please send me more information on MIM 85, in English ☐, in French ☐. I intend to attend as a **participant** ☐, **an exhibitor** ☐.
Name _____
Title _____
Company _____
Address _____
City _____
Country _____ Postal Code _____
Telephone _____ Telex _____
I am a software producer ☐, buyer ☐, distributor ☐, manufacturer ☐.
Types of product _____
For fast convenient phone registration or exhibit space booking call: (514) 288-8811
Visitors, we honor VISA
Please print

SYSTEMS & PERIPHERALS

IBM 1800 followers flock for support

By Donna Raimondi
CW Staff

The IBM 1800 Data Acquisition and Control System — vintage 1964 — inspires kudos from its user base even now. A group of these users has banded together to help each other find parts and service since IBM announced its support for the venerable machine will cease in September 1985.

Of the nearly 2,000 machines built, more than 900 are still up and running, estimated Fred Ludwick, lead engineer for energy management systems at Niagara Mohawk Power Corp. in New York state and systems division manager of Common, the IBM computer users group that is addressing 1800 maintenance issues. Ludwick has two 1800 systems that he uses for acquiring data from bulk power systems for the 24,000 square miles and 3.5 million customers in the Buffalo, Syracuse and Rochester, N.Y., areas, he said.

The 1800 uses core memory, and all its peripherals were hardwired to it originally so interrupts would be vectored to the right place, Ludwick said. Ludwick has switched to IBM 3274 controllers and disk drives built for an IBM Series/1 machine, he said. The original machine had "personality wiring" customized for each user, Ludwick said.



IBM PHOTO

Some users remain loyal to the 1800, despite IBM's plan to discontinue support.

IBM tried to convince 1800 users to migrate to its System/7 and then to its Series/1 minicomputers, but customers were not pleased with those arrangements, Ludwick said. The 1800 had a selector channel so users could connect any channel-selectable peripheral to it, such as large disk drives or printers, which the other machines did not offer, he said.

In addition, users of the 1800 could run batch partitions for commercial functions and run real-time partitions simultaneously, another function the Series/1 and System/7 did not offer, he added. There is no real migration path for people who have millions of lines of code written for the 1800, because programs were written in 1800-specific assembler language, he said.

Ludwick's company plans on purchasing an IBM 4381 system eventually to replace the 1800 and to add new functions, he said, because his company needs a much larger energy management system than is possible with the vintage machines.

In the meantime, Ludwick acts as an informal adoption agency to match up 1800 parts with people who need them, he said. "I've placed about a dozen," in the last two years. Every now and then he hears about one that got thrown away, and he cringes. "There is a market for the machines," he said.

Timothy Gregory, electronic research

See **1800** page 66

- Benson, Inc. unveiled a a color imaging system/**62**
- Applied Computer Sciences unveiled a Wang-compatible dot matrix printer/**62**
- Sun Microsystems added a graphics processor board and a buffer storage board to its Sun-2/160 color workstations/**62**

INSIDE

Turnkey Systems/**62**
Printers/Plotters/**62**
Board-Level Devices/**62**

Raster Technologies unveils Model One/75 graphics unit

NORTH BILLERICA, Mass. — Raster Technologies, Inc. has unveiled an entry-level version of its Model One graphics system called the Model One/75.

The Model One/75 is available in a deskside tower enclosure and was designed for electrical or mechanical computer-aided design, simulation, modeling and geophysical applications.

Features include a 19-in. monitor with a 1,280- by 1,024-pixel resolution, keyboard, data tablet and a mouse. Other features include a local debugger, command stream translator, local macro programming capabilities, local entry of graphics commands and a Help facility. The Model One/75 is software-compatible with the rest of the company's Model One product line, according to Raster Technologies.

A basic configuration costs $15,950. Display list memory costs $2,950 for 512K bytes, and a direct memory access interface costs $1,500. Shading and depth buffering firmware costs $600, the company said.

For more information, Raster Technologies is located at 9 Executive Park Drive, North Billerica, Mass. 01862.

HP introduces disk drive featuring removable media

PALO ALTO, Calif. — Hewlett-Packard Co. announced a 20.5M-byte removable media disk drive for its HP 1000 and HP 9000 computer systems.

Called the Model 7907A, the unit was designed for use in automatic testing, data logging, computer-aided engineering or security and intelligence applications and is said to be the first mid-range removable-media disk drive HP has offered. Previously, the removable media feature was only available on the company's larger, more expensive disk drives, the vendor said.

HP said the 7907A features a 45-msec average transaction time. An off-line store/restore operation can reportedly be accomplished in two to three minutes, and the unit is capable of performing 22 I/O operation/sec., the company said.

The 7907A uses an 8-in. removable media cartridge, which is reportedly suitable for rugged environments. The 7907A costs $12,500, and extra 20.5M-byte cartridges cost $215 each. The unit will be available in July.

More information is available from the HP Inquiries Manager at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Novix chip boasts more speed than Motorola 68000

By Kathleen Burton
CW West Coast Bureau

CUPERTINO, Calif. — Novix, a five-person company based here, has announced a microprocessor that it claims can operate 10 times as fast as Motorola, Inc.'s 68000. The company said the chip contains 80% fewer components than the 68000. Called the NC4000, the unit is primarily aimed at the scientific and engineering communities where speed is a critical factor, according to John Golden, Novix's general manager.

Golden said the chip is based on a reduced instruction set that enables it to achieve internal processing speeds of roughly 8 to 10 million instructions per second (Mips). Novix will begin shipping the chip in June, with commercial quantities available by September. The chip will cost approximately $100, he said.

The NC4000 chip was designed by Novix principal Chuck Moore, who invented the Forth Language in 1970. The chip's instruction set is based on 20 to 30 Forth words, which act as the chip's machine language, according to Moore.

Leo Brodie, a Novix consultant, said commercial applications for the NC4000 will include robotics, single-chip device controllers for hard and floppy disks and video displays and digital signal processing for military and computer graphics applications. Tom Cholipski, director of technical operations at Sysorex International, the venture capital firm based here that financed Novix, said the chip can also be used to generate real-time graphics. The NC4000 can generate animation at 60 times a second.

Cholipski claimed, however, that to realize its design potential, the NC4000 must focus on languages other than Forth, which has roughly 20,000 users.

Moore contends his chip can operate with other languages, using an assembler or a compiler, but he admits doing so will slow the chip's processing speed to approximately 3 Mips .

Ray Duncan, president of Laboratory Microsystems in Los Angeles, which develops and markets Forth language software, said the NC4000 design is hampered by a lack of memory space and inadequate addressing capability which make it a poor vehicle for transferring the new chip idea to other languages. Duncan said that, on paper, the chip performs well, but once it is buried under the operating system and peripheral controlling devices or acts as a coprocessor with systems like the IBM Personal Computer, its speed advantage is substantially reduced.

Ken McKenzie, a Dataquest, Inc. analyst, said the chip's potential is difficult to gauge because silicon development is only 5% to 10% of a chip's success. Commercial success depends on other factors, he said, such as whether the chip is producible economically and the availability of second-sourcing potential.

Novix is located at 10590 North Tantau Ave., Cupertino, Calif. 95014.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

■ **Benson, Inc. has announced its Color Imaging System, which combines a Color Image Processor (CIP) unit with the company's Colorscan 800 ink-jet color plotter.**

The user connects the CIP unit to the Benson Colorscan 800 and to an IBM 5080 workstation with analog cables to plot screen images using a video sampling technique. The video sampling technique is said to allow the CIP to grab the image off the screen and transfer the pixels directly to the plotter.

If optional memory is added, the screen images are sent to the CIP in seconds, the screen is frozen for two seconds while the data is dumped into memory and the user can go back to work on the workstation, according to the vendor.

The plot is said to be complete in less than five minutes.

The CIP also adds multiplexing capability to the Colorscan 800. Up to four different workstations can share the system.

Features include selectable black/white field reversal, limited-color mode and accentuated black. The CIP formats the data necessary to drive the Colorscan 800.

The basic one- or two-user system costs $19,500 for the Colorscan 800, the CIP and the necessary cables. Additional memory of 3M bytes to 4M bytes, depending upon the workstation configuration, costs $3,000 and allows up to four users to use the system.

Benson, P.O. Box 32059, 2690 Orchard Park Way, San Jose, Calif. 95152.

PRINTERS/PLOTTERS/ PERIPHERALS

■ **Applied Computer Sciences, Inc. (ACS) has released its Wang Laboratories, Inc.-compatible printer, the ACS Genicom 3404 dot matrix printer.**

Applied Computer has taken a Genicom Corp. printer and added an ACS interface unit that provides the printer with Wang OIS and VS systems compatibility, the vendor said. The ACS interface has self-test diagnostics.

The printer works at 480 char./sec. in draft mode and 100 char./sec. in near letter-quality mode, the vendor said.

Options include a color option feature for color printing, a draft-speed-only mode and a quiet version of the printer, the vendor said.

The ACS Genicom 3404 costs $4,995.

ACS, 12910 Kingsgate Way N.E., Kirkland, Wash. 98034.

BOARD-LEVEL DEVICES

■ **Innovative Computer Technology, Inc. has announced its Monitor Attachment card which plugs into the I/O slot of an IBM Series/1 processor to detect and correct problems such as machine failures and power interruptions.**

The device reportedly can warn staff of problems by sending messages through a bisynchronous adapter that will dial a modem and flash messages on the staff member's terminal screen, the vendor said. It can issue reboot messages to the processor in case of a Series/1 failure and relay the time and date to the operating system via a real-time clock with battery backup.

The system costs approximately $1,200.

Innovative Computer Technology, 30 Broad St., Denville, N.J. 07834.

■ **Raster Graphics, Inc. has announced a red-green-blue (RGB) color graphics generator board that was designed for Intel Corp. Multibus applications that require text and graphics.**

The RG-12C board provides 512-by-240-pixel resolution with four pages of memory, eight colors and a 60Hz refresh rate, the vendor said. The board is used with RGB color or black-and-white television monitors.

The board costs $695.

Raster Graphics, P.O. Box 5157, Bend, Ore. 97708.

■ **Sun Microsystems, Inc. announced a graphics processor board and a buffer storage board for its Sun-2/160 color workstation.**

The two boards are said to improve the Sun-2/160's speed in graphics-intensive applications.

The graphics processor board reportedly improves processing speed in two- and three-dimensional transformation, clipping, scaling and rendering operations. The unit enables the Sun-2/160 to draw vectors with floating-point coordinates at 1.5M pixel/sec. This, the vendor said, allows users to draw 25,000 three-dimensional vector/sec. The shade rate of three-dimensional polygons, including hidden surface removal, is 1M pixel/sec. with fill rates of up to 35M pixel/sec. Polygons are generated and processed at 1,000 pixel/sec., the vendor said.

The graphics buffer board is said to improve hidden surface removal response time. Both boards cost $5,900 each.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.



"I still say the things had a breakdown!"

Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld's* International Marketing Service (CWIMS). Because we have the microcomputer market *covered* with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.



Now, with the help of *Computerworld's* International Marketing Services, you can advertise in twenty magazines devoted exclusively to supplying information to microcomputer users in: Australia (*MicroWorld, Australian PC World*), Brazil (*MicroMundo*), Canada (*PC World Canada*), Denmark (*Micro Verden*), Finland (*Mikro*), France (*Golden, OPC*), Japan (*PersoCom World*), Mexico (*Compu Mundo*), Norway (*Mikro Data, PC Mikrodata*), Sweden (*MicroDatorn, Min Hemdator*), Spain (*Micro Sistemas*), Sweden (*Svenska PC World*), The Netherlands (*Micro/Info*), West Germany (*MicroComputerwelt, PC Welt, Run*). And your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of over 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me information on your:
☐ Microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Where can you find a powerful data processing system that integrates voice, uses multiple operating systems, and delivers voice and data at 2.56 Mbs to the desk over twisted pair telephone wire?

Northern Telecom invites you

The Meridian DV-1 Data Voice System. A direct result of our commitment to OPEN World™ and the simultaneous integration of data, voice, text and graphics.

[illegible] and OPEN World are trademarks of Northern Telecom.
[illegible] a trademark of AT&T Bell Laboratories.
MS-DOS™ is a trademark of Microsoft Corporation.
CP/M™ is a trademark of Digital Research, Inc.
IBM™ is a trademark of International Business Machines Corp.
© Northern Telecom, 1985.

o meet on the Meridian.



dian™ DV-1 is a system designed for
ental and branch office use for up to 100
moving data and voice over twisted pair
ephone wire at speeds of 2.56 Mbs to the desk.

Because of its multi-processor architecture, users can have multiple applications running simultaneously, enabling them to switch from application to application at the touch of one or two buttons. They can access their preferred UNIX,™ MS-DOS™ and CP/M™ based application software, running on multi-user industry standard operating systems.

Users can develop their own applications using standard languages including "C," COBOL, FORTRAN, or BASIC with the aid of application development tools like generators, editors and debuggers. Applications can be programmed to interact with the call processing capabilities, delivering integrated voice and data solutions.



The Meridian DV-1 links the Meridian M4000 series of integrated terminals and IBM™ PCs at a speed of 2.56 Mbs to the desk. Other vendors' switching systems and computers may also be easily accessed. The Meridian DV-1 allows all relevant media—data, voice, text and graphics—to be handled in a single, integrated system. With voice access through the new Meridian M4000 integrated terminals or standard telephones, users have not only a multi-functional data terminal but also sophisticated phone features from which to choose.

And, because it's based on Northern Telecom's digital telecommunications experience, the Meridian DV-1 is a system that has the reliability you'd expect from a telephone system. And with the same ease of relocation.

For more information on the Meridian DV-1 Data Voice System, write Northern Telecom Inc., P.O. Box 202048, Dallas, TX 75220; or call (800) 328-8800, ext. 400. In Canada, call (800) 361-5883.

When there's business to be done, business meets on the Meridian.

nt northern telecom

1800 from page 61

assistant at TRW Corp. in California, agrees that there is a market for them. Gregory has been trained to assume the maintenance of both the 1800 hardware and software for his company.

TRW has had three 1800s since 1969, two of which are used for spacecraft testing, Gregory said. The company is planning to keep the old IBMs for the duration of the test program — into the 1990s, he said. Gregory found a spare 1800 in another part of the company and bought a surplus model from the California Gas Co., he said, so he is not really worried about getting parts.

TRW will keep its machines because there is no migration path that makes sense economically, Gregory said. The 1800 uses IBM's MPX and TSX operating systems, which were peculiar to it, he said. All the software used in the testing program was written in house, and it would be too expensive to start from scratch with another system.

"The 1800 is the last of a breed," Gregory said. It was built strictly for process control, where each device is assigned an interrupt level that cannot be changed via software, he said. "The processor sits there and waits for [an] interrupt to happen, and then it goes out and does something," he said. The closest thing to it is the IBM Series/1, he said, but software can change the interrupt level of the Series/1.

TRW's 1800s were in storage for six years during a cessation of the spacecraft testing program, Gregory said. "It took me nine months to revamp everything," he said. The machines have to be booted with a card reader, he said, something which he is trying to get around now. A lot of the circuit cards in the machine are the same as those used in IBM's 360/370 series machines, he said, but the solid logic technology cards that are particular to the 1800 will be hard to find.

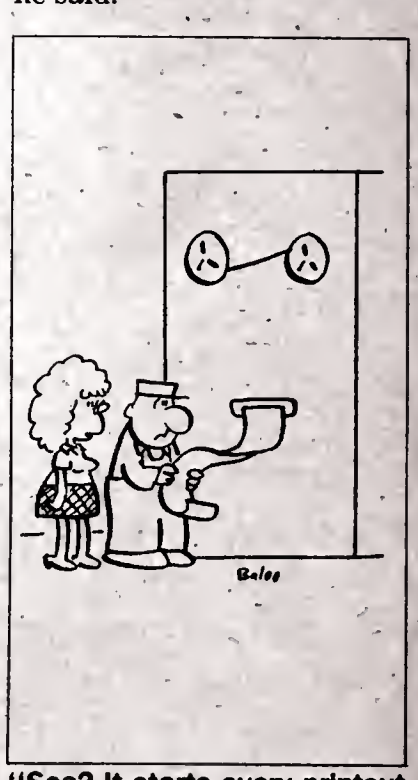
Terry Littlewood, a TRW employee who oversees U.S. Air Force (USAF) projects, is responsible for 11 1800s that are located in three different sites around the country. They are used for calibrating and certificating the guidance and control systems of the USAF Minuteman fleet, Littlewood said.

Littlewood's group is putting together information needed to contract later this year with a company to build an 1800 emulation system, he said. "We'll also try to get as many spare parts as possible from IBM," he said. The main thrust of the 1800 policy will be to maintain the 1½ million lines of code in the system,

> ***TRW will keep its [1800] machines because there is no migration path that makes sense economically.***

he said. "Rather than rewrite, we'll try to emulate the timing, instruction set, interface [and so on]," he said.

Littlewood sends his staff to be trained at a power plant in Ontario in the care and maintenance of the old system, he said. The processor is extremely reliable, Littlewood said, but he has problems with the peripherals, which, on some of his systems, are the ones that came with the systems years ago. He has teletype IBM 1053 printers, but through the Common users group, he has gotten directions for building an RS-232 interface that he has tried — unsuccessfully so far — to connect to a Texas Instruments, Inc. printer. He also still uses IBM 1810 and 2311 disk drives, he said.



"See? It starts every printout with 'I'll never lie to you.' "



So you've been put in charge of making sure data flows smoothly to and from your company's remote offices.

You could continue the expensive practice of transmitting strictly by modem. (The phone company would like that very much.)

Or you can cut costs by cutting phone lines.

With Codex's complete line of statistical multiplexers.

You see, what a Codex mux does is take data that used to be transmitted over two, three, even sixteen lines and transmit it over just one. Doing this not only decreases phone line costs, but increases operating efficiency as well.

In fact, a Codex mux can save your company considerable time and money. Even if you're only networking as few as two terminals.

Later, when your needs expand, so can your network. Codex has muxes that can support anywhere from just a few terminals to several hundred. Whether they're graphics terminals, printers, pc's or CRT's.

A Codex applications expert will gladly tell you more about the advantages of taking away your computer's phones.

Get us on the line. For more information, **call 800-426-1212. Extension 240.** Or write Codex Corporation, Dept. 707-240, 20 Cabot Boulevard, Mansfield MA 02048.



codex

MOTOROLA

© Copyright 1985 Codex Corp.

COMPUTER INDUSTRY

UCS merger hails major TRW impact

By Peter Bartolik
CW Staff

ROCKAWAY, N.J. — When a $10 million company is acquired by a $6 billion company, convention would suggest that the smaller entity is in for some big changes.

But the recent acquisition of Ultimate Computer Services, Inc. (UCS) by TRW Corp. seems to indicate more of a change for the larger company.

At UCS, a company engaged in refurbishing and reconditioning used IBM computer equipment, chief executive officer and cofounder Bob LaRocca is staying on as director of reconditioning services for TRW's Customer Service Division. In a recent interview, he said the merger into TRW essentially chops three years off of his five-year plan for national expansion and "saves us the aggravation of going public."

At TRW, according to Industry Services Director John Harnett, the merger will enable the service giant to establish a regional network of UCS refurbishing centers. It also provides TRW with UCS' cadre of experienced field engineers with large IBM mainframe experience who can seed TRW's existing field service organization and create a new business opportunity for the third-party service company.

UCS, soon to move its headquarters from Denville, N.J., to Parsippany, N.J., operates two refurbishing and storage facilities, one here and the other in Bensenville, Ill. According to LaRocca, the Chicago and New York-New Jersey hubs probably account for 50% of the movement in used IBM computers. Harnett said plans call for additional facilities to be opened this year and next year in markets that represent concentrations of dealers and lessors.

Literally founded in a basement garage

See ULTIMATE page 80

CEO predicts MSA's future

Acquisitions, sales, competition addressed

By John Desmond
CW Staff

NEW ORLEANS — Management Science of America, Inc.'s (MSA) Chairman and Chief Executive Officer John Imlay was interviewed here at the recent Interact meeting attended by 3,200 MSA users.

In sum, Imlay said MSA will be acquiring more software firms to move into new vertical markets; that the domestic division of its subsidiary, Peachtree Software, Inc., will be sold within weeks; that if he had a chance to do it over, he still would have bought the Peachtree micro software company; and that MSA is bracing itself for IBM's entry into the applications software arena.

Imlay commented on the following topics:

How MSA will become a billion-dollar company: "We've obtained a great deal of capital and now have $85 million, which is earmarked to move into different areas of



Imlay

software. You will see us in the future moving to other vertical markets. We want to wrap our financial cross-industry general ledger and payroll systems around specific industry systems."

How MSA can keep pace with Cullinet Software, Inc.: Figures from the respective companies show that MSA is growing at a 20% annual rate, while Cullinet is growing at a 50% quarterly rate. "Cullinet is in the data base or systems software area in a dramatic way. They've done an excellent job. That particular point in the

See IMLAY page 76

TI admits profit plunge, layoffs

By Clinton Wilder
CW Staff

DALLAS — Texas Instruments, Inc. became one of the hardest hit companies in the current high-technology slump with its recent announcement of an additional 1,000 layoffs and an 88.6% plunge in first-quarter profits.

TI President J. Fred Bucy surprised most industry analysts when he told shareholders at the company's annual meeting that first-quarter earnings totaled just $9.1 million, or 37 cents per share. The company earned $79.8 million, or $3.32 per share, in the first quarter of 1984. Rev-

See TI page 75

Tax reform big business

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Robert Mattson, IBM's director of taxes, was not a popular fellow at a recent business conference on tax reform here. Amid a roomful of tax lobbyists who had united to win accelerated depreciation schedules in the first rush of the Reagan era, Mattson said those benefits should be weakened so that business income tax rates can be sharply reduced.

Afterward, Mattson faced a host of questions from the audience. It was a scene that illustrated the uncharacteristic

See TAXES page 80

■ A Japanese researcher said he found it hard to believe that the fifth-generation project poses any threat to U.S. industry/**68**

■ Storage Technology announced a four-day workweek for some production personnel, layoffs at its printer division and a Securities and Exchange Commission investigation/**71**

■ Boston's version of a computer trade center may still open early next year, but it won't bear much resemblance to the original concept/**74**

Industry projections show familiar pattern of decline

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

About six months ago, semiconductor industry observers and participants were saying business would pick up again after the end of the year. A couple of months later, they were saying wait until the second half of this year. Now some are saying to wait until next year.

Two months ago, computer equipment vendors and industry watchers were saying business would be off in the first three months of the year, and the broad consensus was that a short-term downturn was materializing. But over the past two months, consensus has shifted to the opinion that the first half of the year will be bleak, followed by a rebound in the second half.

Over the past few weeks, bad news has been followed by bad news. The bad news initially centered on the minicomputer industry but has now spread far and wide. Although there have been isolated incidents of good news, the trend seems to be toward greater disappointments, as witnessed by the financial results of such firms as IBM, Control Data Corp., Computervision Corp., Wang Laboratories, Inc. and Apple Computer, Inc. More recently, Digital Equipment Corp. hinted at short-term revenue pressure, and Data General Corp. said profits for the year will be flat.

In general, the stock markets have reacted stoically to the flood of bad news. Stocks have dipped, but there has been no bloodbath on Wall St., apparently because stock prices have floated down gradually in anticipation of short-term setbacks. But the greater reason for the mellow reaction seems to be faith in the projections of IBM.

IBM admits problem

In coming as close as it ever will to admitting a mistake, IBM implied that its greatest problem, aside from the strength of the U.S. dollar, was a "wait-and-see" attitude on the part of large mainframe customers who wanted to find out what the Sierra CPUs mean to older products.

IBM said in no uncertain terms that it expects the second half of the year to make up for the first quarter and for the second quarter that seems to be going down the tubes.

That pretty much sums up the outlook that the leading semiconductor companies projected about six months ago. But a number of factors have aggravated and extended the chip industry's problems: excess capacity, reluctance by customers to resume ordering at the preslump pace and the realization that the ironclad law of supply and demand dictates price cuts in times of oversupply.

The chip vendors' prime customers are the computer equipment manufacturers. If chips are not being sold, that can only mean that equipment vendors are faced with excess capacity, customer reluctance to resume ordering at the preslump pace and the looming reality of the law of supply and demand. Even mighty IBM will have to ship at an incredible rate in the second half of the year to make up for the disappointments of the first half. And if IBM turns out to be not so mighty after all, the bloodbath in the industry will begin.

Japan's FGCS Project: Fire behind the smoke

OUTSIDE LINES
John McWilliams

Since the Japanese Fifth-Generation Computer Systems (FGCS) Project was initiated in April 1982, American opinion has seemed divided between those who view the project and its goals as "a lot of smoke" and those who see a scheme designed to make Japan the "dominant industrial power in the world" by the late 1990s.

The people at the Institute for New Generation Computer Technology (Icot), the organization charged with quarterbacking the FGCS Project, perceive the project in quite a different light. According to Yoshihisa Ogawa, chief of Icot's Research Planning Section, the FGCS Project is a "national project" aimed at developing "basic technologies" that will enable the realization of innovative "knowledge processing" systems for use in the advanced information society of the 1990s.

Since the FGCS Project, now entering its second stage, is proceeding as planned and producing the anticipated results, it can hardly be considered a lot of smoke. And as for the cries of Japanese world industrial hegemony being raised in certain quarters, Ogawa said he found it extremely hard to believe that the 50 researchers at Icot, and the 200 or so additional personnel at other participating corporate and national research laboratories, pose much of a threat to American industry.

Any advantages the Japanese might have hoped to gain by getting the jump on the rest of the world in creating a "knowledge industry" and the tools necessary to capitalize on it seem unlikely to materialize now that a number of fifth-generation computer-related projects have also been started in the U.S. and Europe. There are two such projects under way in the U.S. — the Department of Defense Advanced Research Projects Agency's Strategic Computing and Survivability Project, begun in 1984, and a private-sector project begun in 1983 by the Microelectronics and Computer Technology Corp. European fifth-generation projects include Great Britain's Advanced Information Technology Project and others being studied in France and West Germany.

Rather than feeling threatened by these other fifth-generation projects, Icot welcomes them. "We have been actively promoting international cooperation in the development of [FGCS] technology all along," Ogawa said.

As testimony to the "openness" of the FGCS Project, Icot has sent a number of researchers and specialists to the U.S. and Europe each year since the start of the project to give talks at conferences and symposia. Icot has also invited, on average, eight experts from various fields and countries to Icot every year for about a month each to take an active part in the research and development work being done there.

The FGCS Project is an ambitious, forward-looking 10-year national project sponsored and supported by Japan's Ministry of International Trade and Industry and implemented by Icot. Its stated goals are the development of a non-Von Neumann computer architecture with ultra-high-speed parallel processing functions as a basis for a knowledge-information processing system with symbolic inference capabilities, large-scale knowledge bases and advanced human interfaces.

The project has been designed to be carried out in three stages: a three-year initial stage (1982-1984), a four-year intermediate stage (1985-1988) and a three-year final stage (1989-1991).

The initial stage saw the successful completion of research into various parallel inference schemes for an inference subsystem; the development of a parallel-type relational data base machine called Delta as part of the knowledge base subsystem; the establishment of specifications for basic software systems; and the development of a sequential inference machine, its programming and operating systems and ESP, a sequential logic programming language designed for use in future software development.

The project has now entered the intermediate stage. During the next four years, the fruits of the initial stage of the project will be used to determine the algorithms and basic architecture necessary to develop the inference and knowledge base subsystems that will form the core of the fifth-generation computer system.

The final three-year stage of the project will be devoted to integrating the various hardware and software components to achieve a working prototype of the envisioned fifth-generation computer system.

McWilliams is managing director of The Word Shop, Ltd., a Yokohama, Japan-based translation company specializing in texts in the fields of computers, data communications and robotics.



Xerox D25 Diablo daisywheel printer

Get daisywheel letter quality at dot matrix prices with the new Diablo D25 from MTI.

This quiet, 25 cps daisywheel printer performs a full range of word and data processing tasks. Its all-purpose interface makes the Diablo D25 compatible with virtually any microcomputer on the market.

Diablo printers are known for their reliability, and the D25 is no exception. On average it operates for over 4000 hours without repair or maintenance, and takes only 15 minutes Mean Time to Repair.

MTI is an authorized distributor for Diablo Printers, so we can get these high quality, inexpensive beauties to you quickly. Whether you buy, lease or rent, MTI is the one source for all the computer and data communications equipment, applications expertise and service you'll ever need. At prices that are hard to beat. Call MTI and save.

mti systems

A SUBSIDIARY OF DUCOMMUN INCORPORATED

Computer & Data Communications Equipment Sales / Leasing / Service / Systems Integration

Digital Equipment Corp., Intel, Texas Instruments, AT&T, ADDS, Qume, HP* Dataproducts, Diablo, Epson, Lear Siegler, Esprit, Wyse, Link, C.Itoh, PCI Racal-Vadic, MICOM, Ven-Tel, Develcon, Control Data, Emulex, U.S.Design

New York:	New Jersey:	Ohio:	Kentucky:
212/226-2337	201/227-5552	216/464-6688	502/449-6656
516/621-6200	Pennsylvania:	513/891-7050	California:
518/449-5959	412/931-9351	*Franchised areas only.	818/883-7633

All other areas: 800/645-6530

XEROX®, DIABLO®, and the identifying numbers herein are trademarks of XEROX CORPORATION.



Reach over 35,000 computer professionals in The Netherlands.

Advertise in CW Communications' publications in The Netherlands and sell your products directly to the fifth largest market in Western Europe for installed general purpose computers and ninth world-wide. According to figures from International Data Corporation (IDC), the world's leading information industry market research firm, total DP expenditures in 1984 were at $3.3 billion. IDC forecasts that by 1989 total DP expenditures will exceed $7.1 billion. CW Communications covers The Netherlands and Benelux countries market with two publications; *Computerworld Benelux* and *PC World Benelux*.

20,000 MIS/DP executives read *Computerworld Benelux* each week. *Computerworld Benelux* is modeled after its sister publication in the U.S., *Computerworld*. The editorial covers new products and services, current applications and industry trends.

PC World Benelux is published six times per year and is modeled after *PC World*, its sister publication in the U.S. *PC World Benelux* is read by more than 15,000 commercial users and prospective buyers of IBM and compatible computer equipment, and the key decision makers of small, medium, and large companies.

CW International Marketing Services makes advertising your products in The Netherlands, and around the world, easy. We have over 50 publications in more than 25 countries. For more information on our wide range of services, complete the coupon below and mail today.

CW COMMUNICATIONS/INC.

Diana La Muraglia
General Manager
CW International Marketing Services
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me more information on:
☐ *Computerworld Benelux* ☐ *PC World Benelux*
☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

SPECIAL REPORT

Manufacturing Systems

Manufacturers who want to automate their operations have a number of technologies to choose from. In the May 27th Computerworld Special Report we'll explore all aspects of computer integrated manufacturing (CIM):

- computer-aided design & manufacturing (CAD/CAM)
- microcomputer-based material requirements planning (MRP)
- communications networks (including LANs)
- inventory control
- shop floor control.

We'll also discuss how these components tie together, and how they affect MIS/DP operations in a manufacturing environment.

So if you sell manufacturing systems or related products, tell Computerworld's more than 600,000 readers in the May 27th issue. Simply fill out the coupon below and return it today to reserve space for your ad. Or, if you prefer, call Ed Marecki (National Sales Director) at 617-879-0700.

Advertising close: May 10

☐ Yes, I want to reach active buyers of manufacturing systems and related products. Please send me advertising information on the May 27th Special Report issue.

☐ I'd like information about the upcoming Special Report issues of *Computerworld*. Please send me Rate Card No. 20.

☐ Please have a sales representative call me.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Return to:
Ed Marecki, National Sales Director, *Computerworld*,
375 Cochituate Road, Framingham, MA 01701

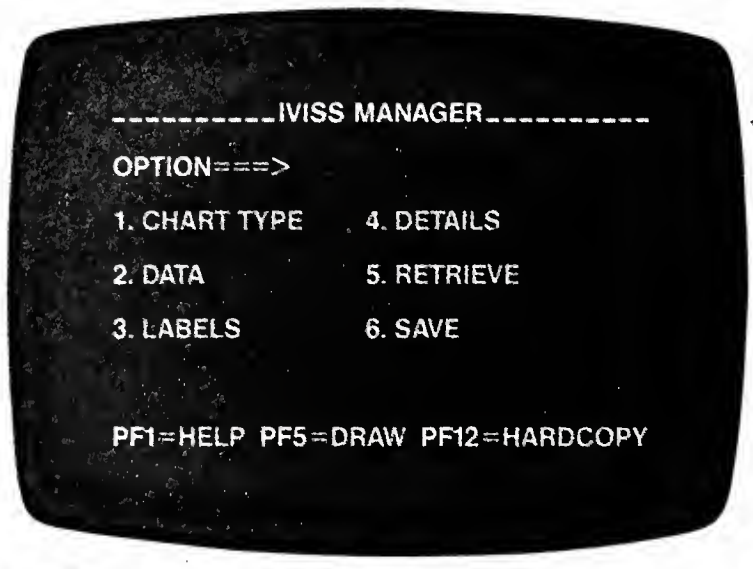
COMPUTERWORLD

A PUBLICATION OF CW COMMUNICATIONS

COMPUTERWORLD

Boston: (617) 879-0700/**Chicago:** (312) 827-4433/**New York:** (201) 967-1350/**Atlanta:** (404) 394-0758/**Houston:** (713) 952-1220/**San Francisco:** (415) 421-7330/**Los Angeles:** (714) 261-1230

CREATE CHARTS IN FULL-SCREEN ISPF.



NEW IVISS™ FOR IBM®

Only IVISS combines mainframe power and ISSCO quality with full-screen ease of use. Get the full story today. Call for more information and reserve your place at ISSCO's next management seminar in your area.

ISSCO

800-556-1234, ext. 530. In CA, 800-441-2345, ext. 530.
Or write ISSCO, 10505 Sorrento Valley Rd., Bldg. 1, San Diego, CA 92121
IVISS is a trademark of Integrated Software Systems Corporation. IBM is a trademark of International Business Machines Corporation.

SPOOL CHARTS TO SLIDES, VIEWGRAPHS AND PAPER.



NEW IVISS™ FOR IBM®

Only ISSCO makes it so easy to get hardcopy through your MVS and VM network. Just one keystroke does it. Call for more information and reserve your place at ISSCO's next management seminar in your area.

ISSCO

800-556-1234, ext. 530. In CA, 800-441-2345, ext. 530.
Or write ISSCO, 10505 Sorrento Valley Rd., Bldg. 1, San Diego, CA 92121
IVISS is a trademark of Integrated Software Systems Corporation. IBM is a trademark of International Business Machines Corporation.

COMPUTER INDUSTRY

Fortune Systems cuts staff, reorganizes management

REDWOOD CITY, Calif. — Citing the need for strong downsizing, Fortune Systems Corp. recently laid off 20% of its work force and reorganized its top-level management positions.

The manufacturer of AT&T Unix-based office automation equipment said it expects a first-quarter revenue decline of 20% to 30% from $15.1 million in the first quarter of 1984, according to a spokesman. Fortune Systems reported revenue of $70.2 million for the year.

The layoff of 100 of the firm's approximately 510 employees took place at all levels of the company except engineering, a spokesman said. "The goal of a profitable 1985 requires strong downsizing early in the year to lower the break-even point," said Fortune Systems President and Chief Executive Officer James S. Campbell.

Under the reorganization, Campbell has assumed responsibility for marketing and sales activities in his current position. Senior Vice-President Robert J. Ruebel moved from marketing to corporate development, and James Ferentz was promoted from vice-president of manufacturing to senior vice-president of operations.

Intel posts profits slump

SANTA CLARA, Calif. — Intel Corp. recently reported that first-quarter profits slumped to $10.8 million, or 9 cents per share, from year-earlier profits of $50.2 million, or 43 cents per share.

Earlier this year, the company said it was anticipating even lower sales and might not post any profit for the quarter.

Revenue for the quarter was $375.2 million, up slightly from $371.5 million a year earlier. Compared with the fourth quarter of 1984, revenue was down 10% and profits were down more than 50%; however, the first quarter was better than Intel had projected earlier this year, when the company said sales could be down 25% from the fourth quarter [CW, March 4].

With the semiconductor industry in a sales slump, Intel laid off 900 workers and closed two plants following the announcement of fourth-quarter results, which were down significantly from those of the third quarter. At the company's annual shareholders meeting recently, Intel Chairman Gordon Moore compared the industry downturn to the oil crisis of the mid-1970s.

Announcing the first-quarter results, Intel President Andrew S. Grove said, "While we don't see any real improvement yet, we feel that we have reached bottom. We expect orders to improve as customers' inventories decline to levels that will trigger reordering."

CAI chief resigns after 17 years; firm to relocate headquarters

BOULDER, Colo. — Computer Automation, Inc. (CAI) recently announced the resignation of its founder and the relocation of its corporate headquarters from here to Irvine, Calif.

David H. Methvin, CAI's founder, president and chief executive officer, resigned April 1 after 17 years with the organization, citing the company's eight straight losing quarters. George Pratt, a company board member for 14 years, assumed the positions of chairman and chief executive officer.

Pratt announced April 2 that CAI will consolidate its operations at the Irvine, Calif., site of its minicomputer division before the end of May. Pratt said the move represents an effort to stem the tide of CAI's operating losses over the past two years, including a $2.4 million loss for the quarter ended Dec. 31.

Pratt also announced that CAI will retain an investment banking firm to assist in recovery efforts, which may include the sale of one of its operations. CAI manufactures minis, micros, distributed DP systems and automatic test equipment for users and OEMs.

Ungermann-Bass' sales down 23%

SANTA CLARA, Calif. — Ungermann-Bass, Inc. reported a 23% decline in first-quarter sales, compared with the fourth quarter of 1984, and a net loss of $514,000, or 3 cents per share.

The supplier of local-area network systems said revenue for the three months ended March 31 was $11.9 million, compared with $15.5 million for the quarter ended Dec. 31. The figure represented a slight increase from $10.8 million in the first quarter of 1984.

Ungermann-Bass' first-quarter loss compared with a $954,000, or 6 cents per share, profit in the same quarter a year ago. Fourth-quarter 1984 profits were $2 million, or 12 cents per share.

COMPUTER INDUSTRY

STC shortens workweek, undergoes SEC examination

LOUISVILLE, Colo. — Storage Technology Corp. (STC) recently announced that, effective May 3, it will adopt a four-day workweek for portions of its manufacturing operations here.

The company also announced that the Securities and Exchange Commission (SEC) is investigating STC's securities offerings, financial reports and books and records dating back to 1981.

The company said the shortened workweek and planned layoff of 160 people at its printer operations in Palm Bay, Fla., were due to a slowdown in the computer industry and STC's reorganization status. Ryal R. Poppa, chairman and chief executive officer, said, "There is a general slowdown that is affecting many companies in the computer industry, and in Storage Technology's case this slowdown is compounded by the company's being reorganized under Chapter 11 of the [Federal Bankruptcy Act]."

Poppa said that under normal circumstances the company would have been able to avoid shortening the workweek, but due to the Chapter 11 situation it must keep manufacturing in line with the current level of business. The company filed for protection from its creditors Oct. 31 of last year.

The company said the shortened workweek does not apply to field service, sales, marketing, systems engineering and support groups.

The SEC investigation reportedly is to determine whether the company followed SEC rules and acceptable accounting procedures in keeping its books, issuing securities and filing financial reports.

Xicor cuts work force, hours

MILPITAS, Calif. — Citing continuing weak business conditions in the electronics industry, Xicor, Inc. announced the layoff of 130 employees and the institution of a four-day workweek for most of its remaining workers.

The semiconductor manufacturer said its 1985 growth rate will be less than it anticipated in 1984, when it significantly increased its work force, facilities, equipment and inventories.

The layoffs reduce the work force from 740 to 610 employees. Only Xicor sales and marketing employees will continue to work a five-day week.

Xicor President Raphael Klien said the cost-saving measures will not affect the company's product development, order delivery and factory upgrading schedules. Xicor expects to break even on an estimated $9 million in revenue for the first quarter of 1985.

Industry reports chip orders, shipments increased in March

SAN JOSE, Calif. — The battered semiconductor industry received some good news in March, as both order and shipment rates for semiconductors increased from February figures. But it was not enough to turn around the industry's weak first-quarter showing.

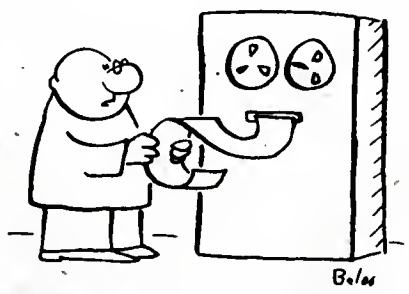
The Semiconductor Industry Association (SIA) reported that March billings from U.S.-, Japan- and Europe-based semiconductor manufacturers rose 21.4% from February figures to $903.9 million. The total $2.4 billion shipment figure for the quarter, however, was down 6% from the first quarter of 1984 and down 18% from the quarter ended Dec. 31.

March orders boosted the average monthly figure for the quarter to $691.1 million, up 4.4% from the average at the end of February.

Predicting continuing slowness in the computer market and excess semiconductor inventories, SIA President Thomas D. Hinkelman forecast a second-quarter semiconductor order rate of $2.5 billion to $2.6 billion, compared with $3.57 billion in the second quarter of 1984. He estimated that the yearly shipment figure for 1985 would total $10.4 billion, off approximately 10% from 1984.

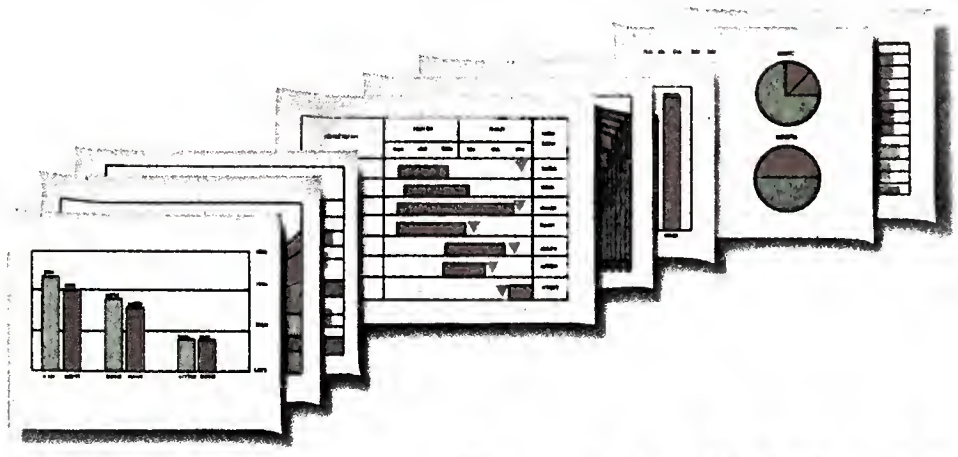
"[The semiconductor industry] recovery continues to be hampered by weak orders for computers and office equipment, whose manufacturers consume about 40% of all semiconductors in the U.S. market," Hinkelman said.

The SIA figures are based on manufacturers who participate in the World Semiconductor Trade Statistics program.



"You wouldn't enjoy it — a disco isn't what you're thinking it is."

DELIVER A LIBRARY OF CHARTS AT THE TOUCH OF A BUTTON.



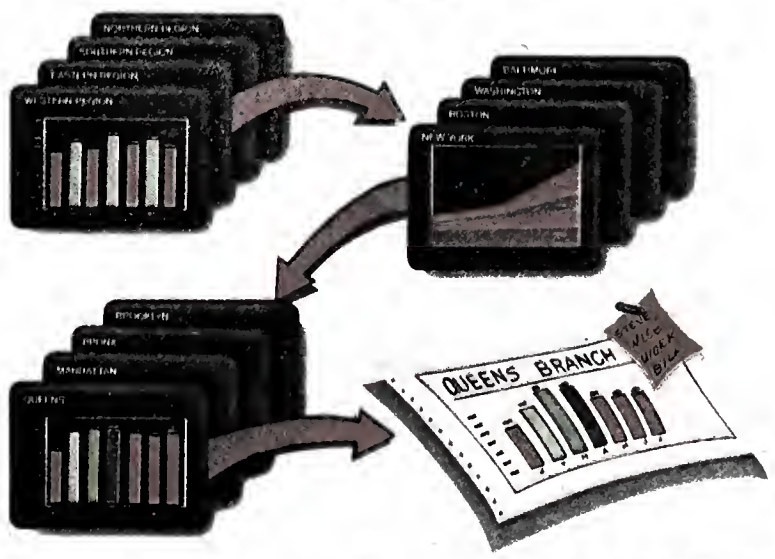
NEW IVISS™ FOR IBM®

Just one keystroke lets you and your users view one chart or browse through a whole library of mainframe data. Only ISSCO delivers graphics so easily. Call for more information and reserve your place at ISSCO's next management seminar in your area.

ISSCO

800-556-1234, ext. 530. In CA, 800-441-2345, ext. 530.
Or write ISSCO, 10505 Sorrento Valley Rd., Bldg. 1, San Diego, CA 92121
IVISS is a trademark of Integrated Software Systems Corporation. IBM is a trademark of International Business Machines Corporation.

ORGANIZE CHARTS IN A TREE-STRUCTURED HIERARCHY.



NEW IVISS™ FOR IBM®

This is the indispensable tool for decision makers. Hierarchal organization enables managers to select and examine only the charts that are relevant... at the push of a button. Call for information and reserve your place at ISSCO's next management seminar in your area.

ISSCO

800-556-1234, ext. 530. In CA, 800-441-2345, ext. 530.
Or write ISSCO, 10505 Sorrento Valley Rd., Bldg. 1, San Diego, CA 92121
IVISS is a trademark of Integrated Software Systems Corporation. IBM is a trademark of International Business Machines Corporation.

30 DAYS ON COMPUWARE

You be the judge. YOU WIN



(You and) Abend-AID vs. The Dump

You be the judge.

You have four cases in front of you: Abend-AID vs. The Dump, File-AID vs. The "Quick Fix", CICS dBUG-AID vs. The "Last" Bug, and CICS Abend-AID vs. The Dump.

The only way to decide each of them fairly is to weigh all the evidence. And when you do, one organization will emerge as the clear winner—Compuware—the logical choice for software products, designed exclusively to work with your IBM systems.

At Compuware, we are committed to finding solutions to your problems. Not only will we help you increase the productivity of your business, we'll save you money at the same time.

But seeing is believing. And we promise to make you a believer. Give our software products a fair trial for 30 days, free of charge. And they'll prove, beyond a shadow of a doubt, what thousands of satisfied users already know: With Compuware on the case, you can be a winner every time.

Call 1-313-540-0400 today for more details.

You can take a stand against memory dumps with Compuware Abend-AID—a unique and highly sophisticated software system that shifts the burden of debugging from the programmer to the computer. In fact, Abend-AID actually analyzes the cause of program abends and tells the programmer: what happened, why it happened, where it happened, and provides the data to fix it.

With Compuware Abend-AID, you'll notice a dramatic improvement in programmer and operations productivity, as well as a more efficient use of resources.

Solve the case of the memory dump once and for all with Compuware Abend-AID.

TRIAL AND WILL HELP YOUR CASE!

(You and) File-AID vs. The "Quick Fix"

You don't have to make a federal case out of redoing your "Quick Fixes," because Compuware File-AID allows fast, easy and secure data handling without programming—regardless of your access method or file organization.

Compuware File-AID is a comprehensive, easy-to-operate, menu-driven software tool that proves itself every day. It consolidates and documents both routine and special utility functions associated with handling files in test and production environments. And its effectiveness can be seen immediately in all areas of data processing: application programming, systems programming and in operations.

Settle the question of the "Quick Fix" in your favor with Compuware File-AID.

(You and) CICS dBUG-AID vs. The "Last" Bug

There's no defense for program re-runs, thanks to Compuware dBUG-AID. It's the low-cost software product that allows programmers to look at cross sections of programs during execution. And by permitting your programmers to interactively debug CICS application programs, their productivity is greatly improved.

For all of its sophistication, Compuware CICS dBUG-AID features an easy-to-learn, easy-to-use format. And it offers three unique transactions that effectively accommodate various levels of expertise: the new user, the experienced user and the systems programmer.

Defend against aggravating re-runs and wipe out the "last" bug forever with Compuware CICS dBUG-AID.

(You and) CICS Abend-AID vs. The Dump

Why waste time manually debugging CICS transaction abends, when there's Compuware CICS Abend-AID—a powerful software tool that works hard solving your problems. Unlike any other product, Compuware CICS Abend-AID has diagnostics which explain the cause of the abend, where it occurred, and how to correct the problem as simply as possible.

With Compuware CICS Abend-AID, programmers can devote more time to developing CICS systems instead of debugging them. Production down time decreases. Efficiency and up time increase. What could be better?

Manual debugging can finally be eliminated with Compuware CICS Abend-AID. Put it to work for you.

COMPUWARE

32100 Telegraph Rd.
Birmingham, MI 48010
(313) 540-0400

Original plans dashed for Boscom high-tech center

By Clinton Wilder
CW Staff

BOSTON — The much-ballyhooed computer trade mart called Boscom may still open here in January 1986, but it will bear little resemblance to the size or purpose envisioned by its founders some years ago. Even the name Boscom may go the way of most of the other ambitious plans for the waterfront high-tech center.

Boscom lives on as one tenant of the World Trade Center of Boston, a business center that plans to offer one-stop access to banking, commerce, shipping and other services to American and international firms doing business overseas. The center received the official blessing of the World Trade Center Association at the association's quarterly meeting in Tokyo April 2.

The new hope for the center is a bittersweet feeling for Boscom, which originally was to occupy the entire site (then 500,000 square feet) with computer vendor displays and demonstrations — an Infomart of the East Coast.

But when two years of marketing resulted in only a handful of leases to high-tech vendors, underwriters FMR Corp. of Boston decided on a different tack. FMR included the project in a joint venture with several other local real estate interests in September 1984 that became part of the World Trade Center. Boscom will use 25% of the center's floor space.

Boscom and its nine computer industry tenants have been on hold since then, with 50% of its 200,000 square feet within the trade center leased. Now with a clearly defined scope and purpose, Boscom representatives hope to woo companies that did not bite in the first round.

Although marketing representatives were able to sell the concept to IBM, Xerox Corp., Lotus Development Corp., McCormack and Dodge Corp., Nynex Corp. and several smaller companies, they barely dented the list of 250 top industry vendors contacted.

"Trying to educate the industry that a computer trade center made sense involved a lot of time and marketing dollars," said Margaret Ake, Boscom's project manager and only remaining employee from pre-World Trade Center days. "It was hard to convince large, successful companies to do something different, and smaller companies weren't planning as far in advance as Boscom because the industry is so volatile."

The perception of competition with Dallas' Infomart and, to a lesser extent, San Francisco's Datamart did not help, either. "Infomart was the first, and some companies only wanted to try one market center as a test," Ake said. "A lot of people thought if anyone was going to be successful, [Infomart developer] Trammell Crow would be. And many companies already had sales offices in Boston, whereas Dallas was more of an untapped market."

Boscom representatives will now try to downplay the Infomart competition and emphasize the advantages of an international business center. Ake led a delegation of four Boscom officials to California's Silicon Valley earlier this month, approaching several of the same firms that were cool the first time around.

"With the World Trade [Center] aspect, it's different, which will help," Ake said. "And we've realized we're not in competition with each other. I think there is plenty of room for one computer mart in San Francisco, Dallas and Boston."

But any success may inevitably be compared to the original vision of Boscom, which many viewed as a can't-miss proposition in the heart of one of the world's major computer technology centers.

"In the brochure, we still refer to it as Boscom," said World Trade Center of Boston spokeswoman Kim Whittaker. "But to be perfectly honest, I don't know whether the name will be kept."

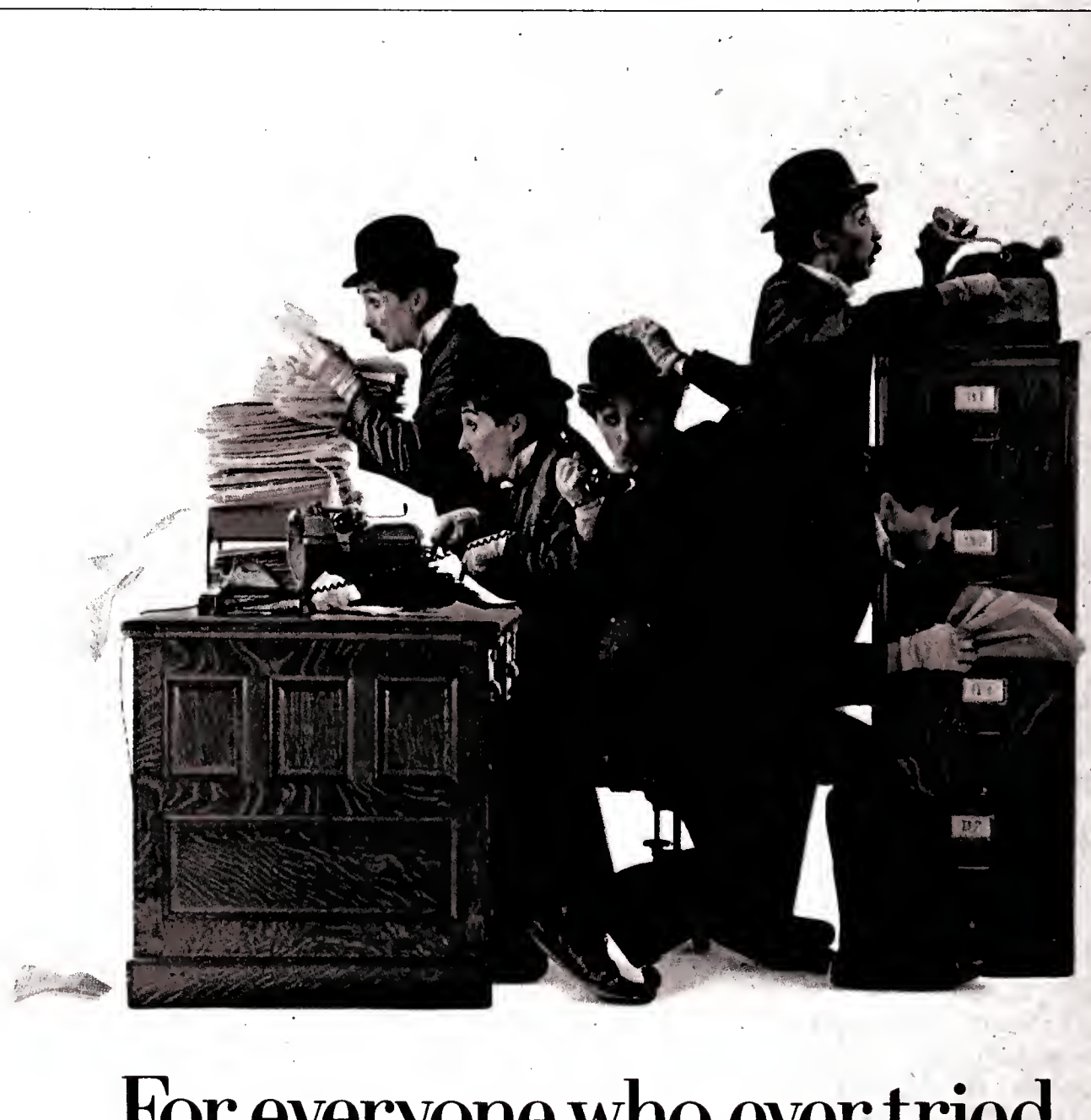
Sorbus to offer STC service

FRAZER, Pa. — Third-party maintenance provider Sorbus, Inc. announced recently it will provide maintenance to users of Storage Technology Corp. (STC) tape and disk drives and printers.

Sorbus, the former service division of Management Assistance, Inc. that was sold to Bell Atlantic Corp., said it will initially offer on-site agreements to STC users in 12 metropolitan markets: Los Angeles, Denver, Dallas, Houston, Chicago, Detroit, St. Louis, Atlanta, Boston, New York, Philadelphia and Washington, D.C.

Ronald A. Wallace, president of Sorbus, said the company has received a number of inquiries about service for products manufactured by STC, which has been operating under Chapter 11 of the Federal Bankruptcy Act since last fall.

"It makes good marketing sense to offer STC customers the opportunity for single-source service for both the peripherals and the IBM mainframes to which most of the STC drives and printers are attached," Wallace said.



For everyone who ever tried doing five things at once

The perfect computer program for someone as busy as you. It lets you keep several other programs working at once.

Do you ever go in so many directions so fast not even a computer can keep up with you?

Well, now an IBM Personal Computer can—thanks to IBM TopView.

TopView is a new kind of software that lets you switch between other programs as quickly as you can change your mind, even run several programs at the same time.

Once you load TopView into your computer, you load the other programs you use most—as many as your computer's memory will permit.

After that, the greatest distance between two programs is just a couple of keystrokes, or (optional) mouse moves.

There's no waiting and a lot less diskette swapping.

But when you're *really* busy is when TopView really shines, letting you do many jobs simultaneously.

For example, you can print a letter, while you search a file, while you analyze a spreadsheet, while your clock/calendar reminds you that your automatic dialer is about to place a call for you.

Little Tramp character licensed by Bubbles Inc., s.a.

COMPUTER INDUSTRY

5¢ 10¢ NICKELS AND DIMES

3Com Corp. reported that revenue for the third quarter ended Feb. 28 increased 129% to $10.3 million from $4.5 million in the same quarter last year. Profits were $859,000, or 6 cents per share, compared with $500,000, or 4 cents per share, in the comparable period one year earlier.

■

Measurex Corp. announced profits for its first quarter ended March 3 of $4 million, or 44 cents per share, compared with $2.2 million, or 28 cents per share, in the like quarter last year. Revenue was $44 million, a 22% increase over $36.1 million earned in last year's first quarter.

■

Systematics, Inc. reported earnings for the third quarter ended Feb. 28 of $2.23 million, or 20 cents per share, compared with $1.4 million, or 13 cents per share, in the same quarter last year. Revenue was $24.4 million, compared with $20.5 million in the prior year's quarter.

■

Evans & Sutherland Computer Corp. announced revenue for the 1984 fiscal year was $70.1 million, a 16% increase over 1983 revenue of $60.6 million. Profits were $7.3 million, or 83 cents per share, down from $10.8 million, or $1.21 per share for fiscal 1983.

Revenue and profits for the fourth quarter of 1984 were, respectively, $20.2 million and $1.8 million, or 20 cents per share, compared with $17.6 million and $3.6 million, or 40 cents per share, for last year's quarter.

■

Software AG Systems, Inc. reported revenue for the third quarter ended Feb. 28 was $12 million, compared with $10.5 million in the like quarter last year. Profits were $1.3 million, or 22 cents per share, compared with $1.7 million, or 27 cents per share, for the same period of the previous year.

■

Tektronix, Inc. announced profits for the third quarter ended March 2 of $26.8 million, or $1.38 per share, compared with $25.7 million, or $1.34 per share, in the comparable period last year. Revenue was $418.3 million, compared with $402.4 million in the previous year's quarter.

■

On-Line Software International, Inc. announced profits of $380,000, or 10 cents per share, for the third quarter ended Feb. 28, compared with a net loss of $241,000, or 6 cents per share, for its third quarter one year ago.

■

Denelcor, Inc. reported profits for the fourth quarter ended Dec. 28 of $202,000, or 3 cents per share, compared with a loss of $5.7 million, or 74 cents per share, for the corresponding period in the prior year. Revenue was $5.9 million, compared with $162,000 in the like quarter one year earlier.

■

Science Management Corp. announced revisions to its 1984 results because of a reallocation of tax benefits between continuing and discontinued operations.

The net losses for the quarter ended Dec. 31 and for the year remain as previously reported, but the continuing and discontinued operations components are revised. Income from continuing operations for the fourth quarter was revised from $191,000, or 7 cents per share, to $634,000, or 24 cents per share.

The loss from discontinued operations for the fourth quarter was increased from $1.05 million to $1.55 million, while the loss from the discontinued operations for the year was revised upward from $2.13 million to $2.37 million. The estimated loss on the disposal of the software systems division, included in the loss from discontinued operation for both the fourth quarter and the year, is now $1.3 million instead of $913,000.

TI from page 67

enue dropped 3.8% to $1.29 billion from $1.34 billion in the same period a year ago.

Although the company said both its computer- and noncomputer-related businesses were slumping, semiconductor industry analysts said TI's downturn reflected its major stake in the hard-hit memory chip market.

TI is a leader in production of memory chips such as the 64K- and 256K-byte products, which have experienced a greater decline in demand than the market for microprocessor chips.

Tl officials painted a dim picture for the rest of this year. Bucy predicted a 15% drop in semiconductor demand this year, and other Tl officials said domestic markets would drop 19%. Both figures are more pessimistic than recent prognostications by analysts and the Semiconductor Industry Association.

"More so than any other major semiconductor supplier, TI has a decided tilt to generic memory chips," said A. A. LaFountain III, president of LaFountain Research in Bay Head, N.J. "That factor more than anything else leads them to portray the market in such gloomy terms. It's a realistic prediction for their product mix."

TI's layoff announcement was the latest in a series of bad news for company employees. The company reduced its work force by 2,000 in December, then announced in February that the temporarily shortened workweek at its semiconductor manufacturing facilities will be continued through the first half of this year.

Company officials cited a continuation of the inventory backlog that has plagued the industry as the reason for additional layoffs.



...IBM presents TopView.

And you can see everything through on-screen "windows" and control it all with easy-to-use pop-up menus.

You can even make unrelated programs work together; say a "Brand Y" spreadsheet with a "Brand Z" word processor.

But simplest of all is a certain "Brand IBM", namely the IBM Assistant Series—for filing, writing, planning, reporting and graphing.

Many other popular programs also work with TopView, and the number is growing.

Naturally, the more computer memory you have, the more TopView can help you. At least 512K is recommended.

And the price is only $149*.

Beyond that, all you need is to be the kind of person who never does a single thing all day, but who wants to do everything, at once.

To learn more, call an IBM marketing representative, or visit an IBM Product Center or Authorized IBM PC or Software Dealer.

For the store nearest you, and a free brochure, call 800-447-4700. (In Alaska and Hawaii, 800-447-0890.)

IBM
Personal Computer Software

*IBM Product Center price.

IBM Presents "Christopher Columbus," The Untold Story, May 19 and 20, 8PM ET on CBS.

IMLAY from page 67

field is growing at a 50% rate, and they're capturing their share of the market. As they get into applications, I think they'll find it a bit different. The need to deal with the end user is a bit different."

On Cullinet's strategy of relying on a data base product: "They're a little bit closer to the fire than we are. If IBM [microcodes software] and comes out with an effective data base package that can compete well with Cullinet, it could bode trouble, just as [Storage Technology Corp.] was in trouble when IBM came out with a disk. Whether IBM closes its machines is still a debatable issue."

On MSA's future strategy in the micro software area: "We're emphasizing workstation software — packages that can be used in a workstation environment and are dedicated to the corporate workstation. We will layer all our systems under Information Expert [MSA's fourth-generation productivity tool] so they can dispense information up and down [from a host] to the microcomputer workstation."

On the domestic division of Peachtree, not yet sold: "We've sold Eduware and Designware to [Encyclopaedia Britannica, Inc.]. We sold our international operation and the micro distribution division. Those went very smoothly. On the Peachtree side, which is word processing and accounting systems, we have had many, many negotiations. Some people turned out not to have money. We hope to have it wrapped up within a couple of weeks." (Imlay would not comment on to whom the division may be sold.)

With the chance, what he would have done differently at MSA: "You're never really happy. If you were, you'd become complacent. But we probably would have gone after more acquisitions more quickly than we have in the past. We probably would have grown the company a little bit faster than we did. Basically, I'm very satisfied."

On Peachtree: "If I had to do it over again . . . I would have done it. At the proper time, it seemed like a good thing to do. I guess we were the first [company] to announce our intentions to get out [of the microcomputer software market]. Since then, we've seen a lot more leave the fold. The market went bad.

"It's very difficult to manage the price deterioration that took place, to manage the piracy. It turned into a merchandising business. We were competing for racks and shelf space. That's not our business. What's the gambler's song — 'You've got to know when to hold and know when to fold up.' "

Strengths and weaknesses of MSA vs. Cullinet; Cincom Systems, Inc.; Hogan Systems, Inc.; and Walker Interactive Products, Inc.: "Our strengths are in our people, our customer base, our technology. We feel we can compete with anyone.

"But the one you didn't ask about, and the one you should ask about, is IBM. We think we're four years away from [it], and we'll be ready for [it], with great strength in our customer base. The concern is not so much with the independents — not to say they are not worthy competitors — but in being ready for IBM when [it gets] in the business."

On the role of stand-alone applications vendors: "A full-service vendor has a great advantage. But there are specialty companies that still have a niche. They'll be very healthy, $20 million companies in the future."

On MSA's emphasis on Information Expert, first announced last fall: "We're conservative in our policies in that we like to have a product tested and working and deliverable [before its announcement]. The R&D has gone on for four or five years. It's here now, and we can sell it. When you talk about futures, sometimes vaporware appears. Last year, we [told] the users it was coming, and the first people began to use it."

What makes a revolutionary idea revolutionary?



Before the Dark Ages went completely dark, man invented the wheel. Took everybody by surprise too, just like STEAMER.

First, it has to be new. Really new. STEAMER is new. Brand new. It's an extremely powerful data compressor combined with a very efficient statistical multiplexer. And it's about to set the data communications industry on its ear.

Our data compression ratio is better than anyone else's.

Nobody but nobody can produce better data compression efficiencies than we can with STEAMER. By using advanced statistical multiplexing techniques which yield statistical efficiencies of about 8 to 1, and passing the statistically multiplexed data through a proprietary algorithm, we get data compression efficiencies averaging 2.2: 1 to 3.2: 1.

That's significantly higher than anyone else. And it means increased throughput and operating efficiency for you. Columbus may have changed the way people thought about the shape of the world. But we're changing the way the world thinks about data compression.



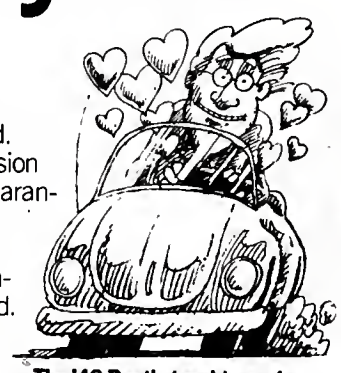
Columbus may have changed the way people thought about the shape of the world. But we've changed the way the world thinks about data compression.

Proprietary compression algorithm: the heart of the matter.

Our proprietary compression algorithm continually analyzes the incoming data stream on a port-by-port basis and compresses the most frequent strings into shorter strings. If the '48 Beetle taught people to think small, we're teaching them to think short.

Because the type and volume of data transmitted on a typical port in one direction on a link may be very different from the data transmitted in the other direction, or on other ports, STEAMER analyzes the data in each direction on a port-by-port basis and builds entirely independent compression tables. That ensures that maximum compression efficiency is obtained.

In fact, the STEAMER compression routine is so efficient, it virtually guarantees no additional delay added to response time. Our compression algorithm can compress or decompress 3,000 characters per second. That's the equivalent of a 14,400 BPS circuit operating at an 83% saturation rate in both directions simultaneously!



The '48 Beetle taught people to think small. We're teaching people to think STEAMER.

We compress the uncompressable.

They said it couldn't be done. But we did it. In some graphics applications we got better than a 2:1 data compression ratio. We can even compress object code files. Which means that in addition to being an outstanding choice to ensure exceptional throughput and operating efficiencies, the STEAMER is really the *only* machine that can do all of the following: remote file transfer, some graphics applications, computer to computer and computer to terminal communications on the same link, maintain system throughput even when modems must operate in fall back mode because of line degradation, increase terminal quantity without scrapping the current modem investment, and relatively secure communications without the necessity of buying expensive encryption equipment.

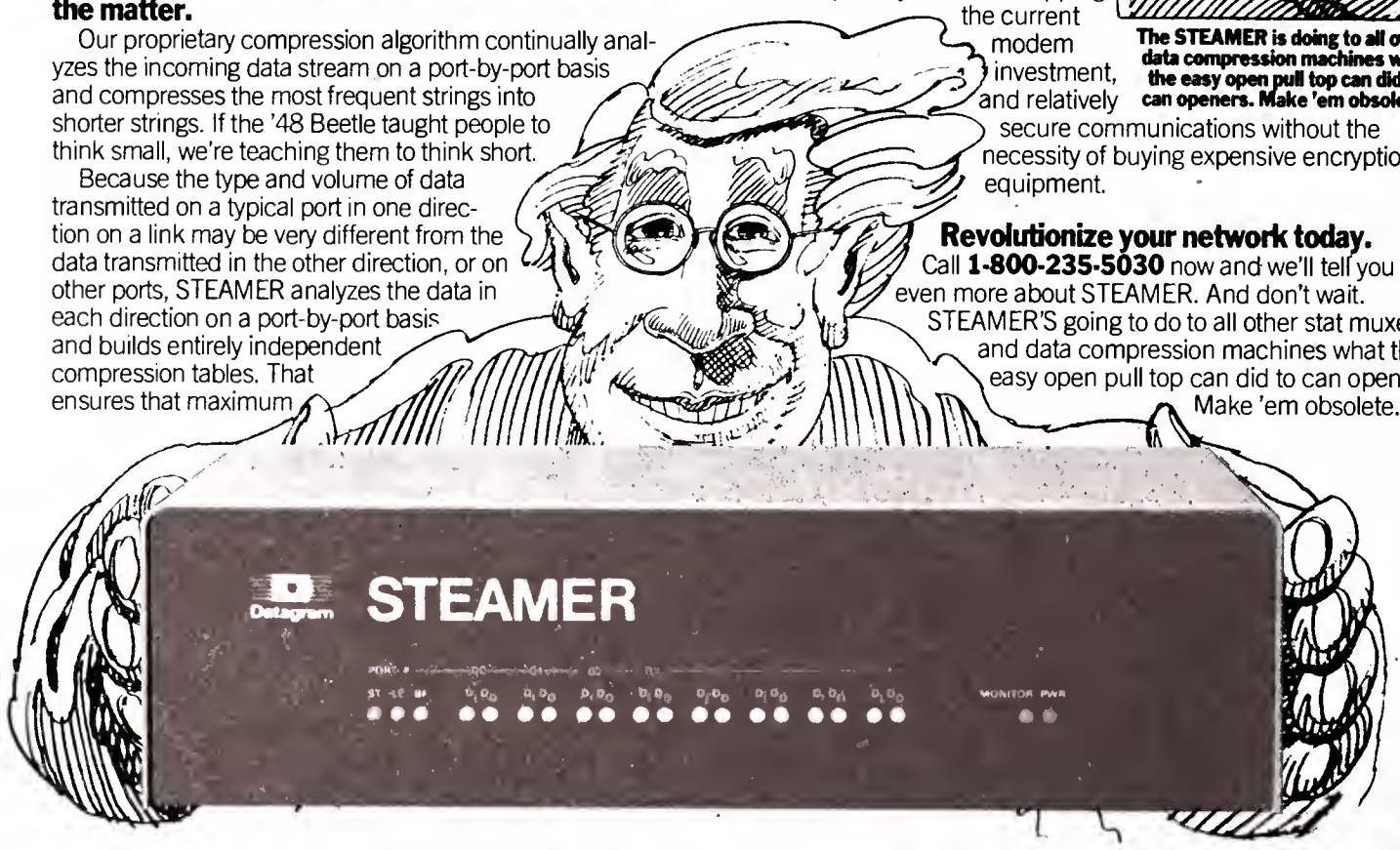


The STEAMER is doing to all other data compression machines what the easy open pull top can did to can openers. Make 'em obsolete.

Revolutionize your network today.

Call **1-800-235-5030** now and we'll tell you even more about STEAMER. And don't wait.

STEAMER'S going to do to all other stat muxes and data compression machines what the easy open pull top can did to can openers. Make 'em obsolete.



On March 4, 1985 Datagram revolutionized the data communications industry with STEAMER.

Datagram We make networks work harder.

USA: DATAGRAM, 11 MAIN STREET, EAST GREENWICH, RHODE ISLAND 02818 CANADA/INTERNATIONAL: DATAGRAM, INC., 1451 GRAHAM BELL, BOUCHERVILLE, QUEBEC, CANADA J4B 6A1
BRANCH OFFICES IN MAJOR CITIES.

MSA posts loss of $2.7 million

ATLANTA — Management Science America, Inc. (MSA) recently reported a net loss of $2.7 million, or 16 cents per share. The company said the results were in line with expectations.

MSA asserted that the loss was normal for the company, which has posted losses in most prior years; the results had been predicted by some securities analysts. In 1984, however, the company posted a profit from continuing operations of $1.1 million, or 6 cents per share.

Revenue for the first quarter was $25 million, compared with $28.4 million a year earlier. The company did not report results for Peachtree Software, Inc., the retail microcomputer software company that it is trying to sell and is treating as a discontinued operation for financial reporting purposes.

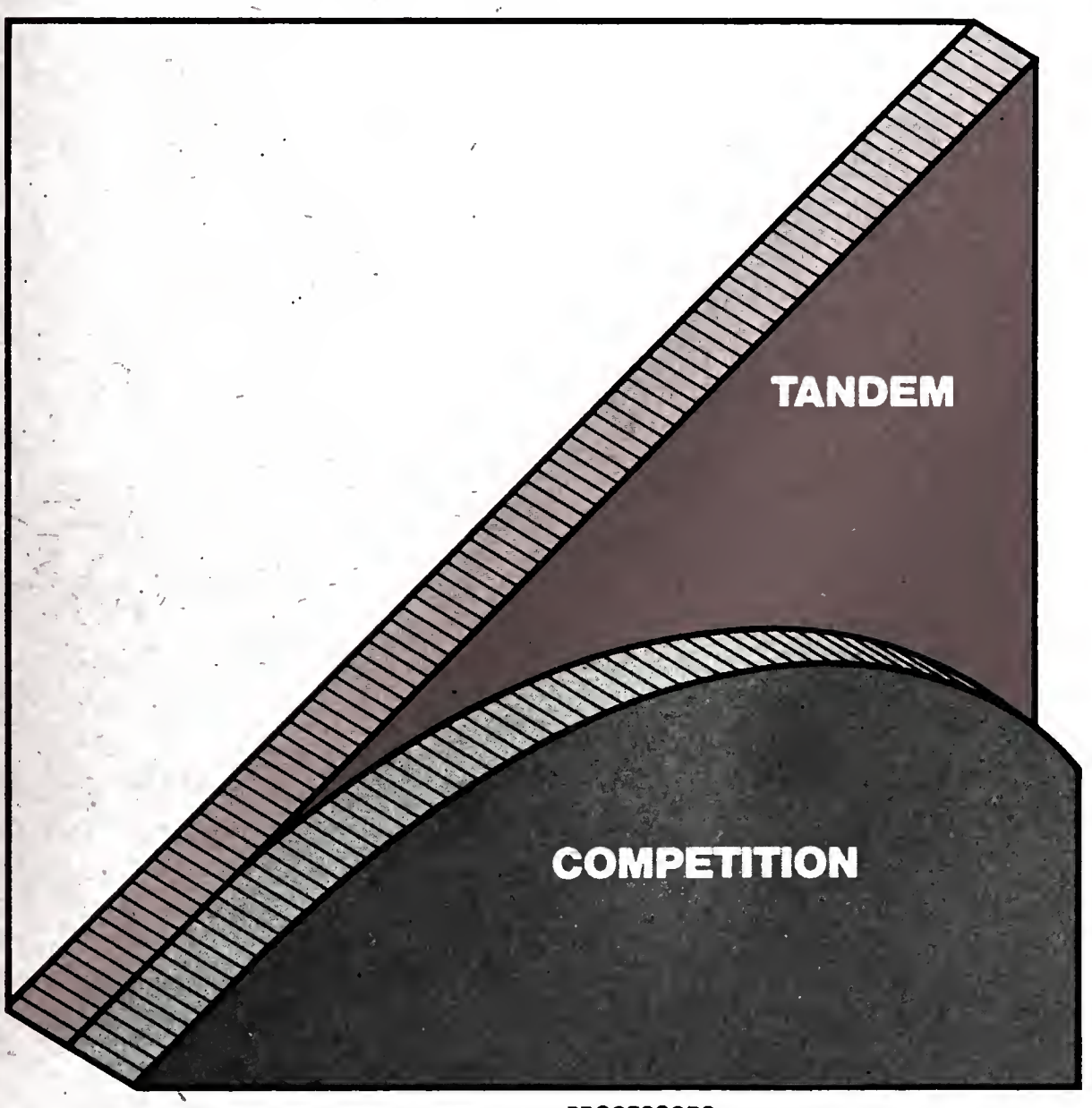
MSA reported operating losses of $7.5 million, but that was offset by investment income of $2.5 million and favorable income tax provisions of $2.3 million.



"This new language, Panic, is ideal for crisis management."

How Computer Fat Bogs Down Performance.

AND HOW THE LEADER IN ON-LINE TRANSACTION PROCESSING INCREASES PERFORMANCE.



As Tandem grows, so does performance. The competition can't keep up.

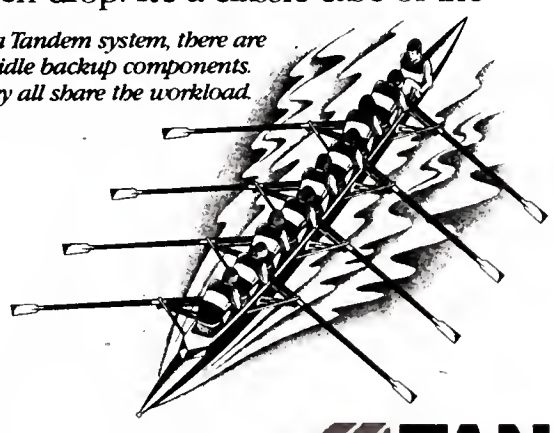
WHAT COMPUTER FAT IS.

Computer Fat is created when you buy more computer than you need. With conventional computer architecture, you have no other choice. You buy the closest fit available and grow into it.

This is wasteful and very expensive.

WHAT IT DOES TO PERFORMANCE.

As your processing needs grow, the problem compounds itself. The more processors you add to the system, the more interfacing is required. Application software has to be rewritten. And the less efficient each processor becomes. Performance levels off. It can even drop. It's a classic case of the faster you go, the behinder you get. The only way out is to junk the system and buy a larger one.



In a Tandem system, there are no idle backup components. They all share the workload.

TANDEM'S NON-FAT SOLUTION.

In a Tandem system, there is no computer fat. Because of our unique, parallel architecture, you never buy more computer than you need. You can start with two processors in a local system and expand at any increment you choose, all the way to 4,080 processors worldwide. And with each step in growth, you get matching performance. In a Tandem system your software expands, too. So you'll never have to rewrite a line of application code.

FAULT-TOLERANT PROTECTION.

It's the ultimate design for on-line transaction processing. A fault-tolerant system that stays on line without using idle backup components. Instead, each component has at least one identical copy with which it shares the workload.

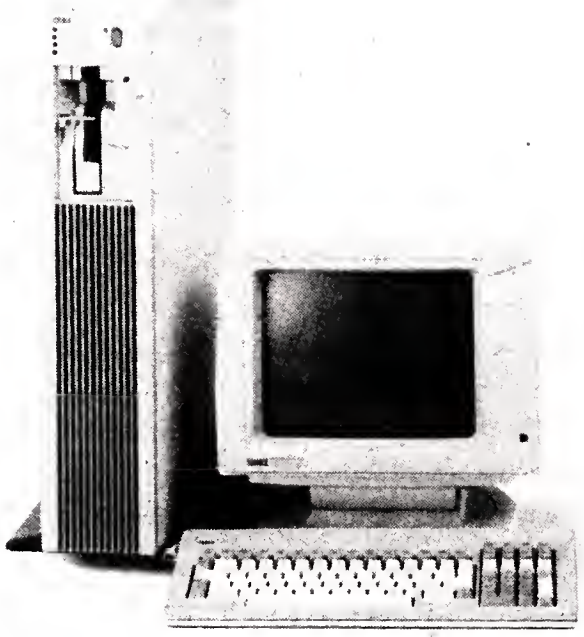
LET'S CHEW THE FAT.

Tandem systems are already at work for FORTUNE 500 companies in banking, telecommunications, manufacturing, transportation, retailing and energy, as well as several branches of the United States Government.

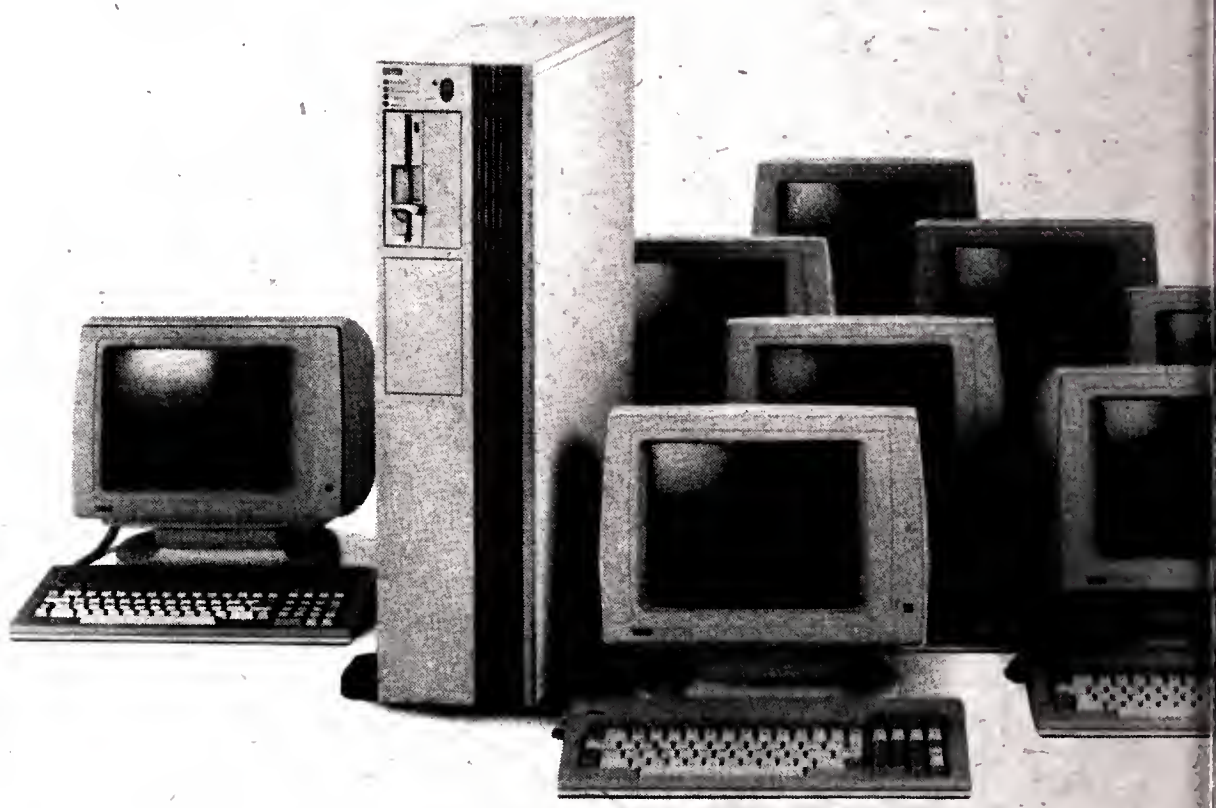
To find out what we can do for you, call (800) 482-6336. Or write for our annual report. Corporate Headquarters: 19191 Vallco Parkway, Dept. 762, Cupertino, California 95014.

TANDEMCOMPUTERS

SOMETIMES YOU NEED MORE
THE QUESTION IS



THE MINI TOWER



THE TOWER

Maybe you run a small business. A department of a large business. Or a nationwide network of businesses.

No matter what size business you run, one of the NCR Towers™ above can help you run it better.

Because they all give your people a lot more speed, memory, storage and versatility than personal computers. For a lot less money.

MORE THAN A PERSONAL COMPUTER IN MORE WAYS THAN ONE.

The Towers utilize UNIX SYSTEM V* or RM/COS* as their operating system. Which means they're perfect for the sophisticated user who wants to write his own programs, as well as for the beginner who can choose from hundreds of off-the-shelf solutions to his problems.

If your business or department has already invested in IBM or IBM-compatible personal computers (the NCR PC 4, for instance), you can use them as intelligent work stations with any of the Towers.

And, finally, the Towers can all stand alone or be networked together. As well as communicate with other computer systems via SNA, X.25 and other industry standard protocols.

THEY PERFORM BRILLIANTLY BECAUSE THEY'RE BUILT BRILLIANTLY.

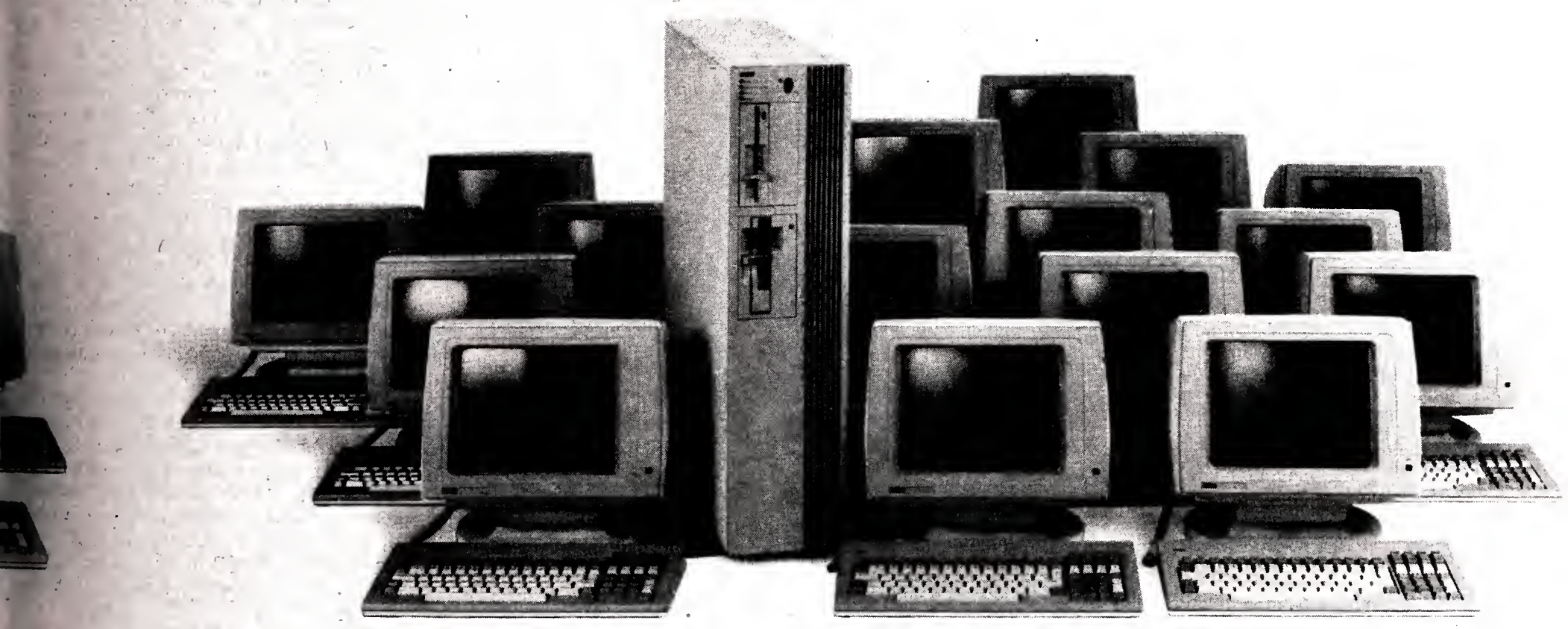
The Towers are all powered by Motorola microprocessors (the regular Tower by the 68000, the XP and Mini by multiple 68010's).

Other state-of-the-art features include Winchester hard disk and the Intel Multibus.* Not to mention an error-correcting memory

© 1985 NCR Corporation

* UNIX SYSTEM V is a registered trademark of Bell Laboratories. Multibus is a registered trademark of Intel Corporation. RM/COS is a registered trademark of Ryan McFarland Co.

THAN A PERSONAL COMPUTER.
HOW MUCH MORE?



THE TOWER XP

and a unique power-failure recovery system that enables all the Towers to survive power outages (thus keeping your data intact).

PEOPLE WHO NEED MORE THAN A PERSONAL COMPUTER DON'T ALL HAVE THE SAME NEEDS.

Of course, the Towers do have their differences.

You can choose from 512 kilobytes of memory to eight megabytes. From twenty-five megabytes of disk storage to 260 megabytes. From a system for one to eight users to a system for up to sixteen users. Starting for as little as $6,995.

But no matter which Tower you choose, you'll choose a computer that's a good deal more than a personal computer. And one which is backed by service from 1,200 offices throughout 120 countries.

Which means that in addition to getting all the computer you need, you'll get all the support you need.

For more information on the NCR Towers, dial us toll-free at 1-800-CALL NCR.

NCR

INNOVATIVE COMPUTER TECHNOLOGY. YOU CAN EXPECT IT FROM NCR.

TAXES from page 67

split that the U.S. Department of the Treasury's tax reform proposal has created in the usually close-knit community of business lobbyists.

The Treasury Department's tax reform proposal would eliminate most business tax breaks — including accelerated depreciation and the investment tax credit — in return for cutting the corporate tax rate from 46% to 33%. Many in the business community are lobbying the department to make changes in the plan before it emerges in final form from the White House in mid-May.

But at the conference, held by the Institute for Research on the Economics of Taxation (Iret), speakers said some firms are lobbying hardest for retention of accelerated depreciation and other capital formation incentives, while others are lobbying hardest for a cut in the tax rate.

The conflict occurs because the tax reform plan is intended to be revenue-neutral in the corporate sector, so retaining corporate tax breaks (such as accelerated depreciation) requires a higher tax rate to pay for them, according to Iret President Norman B. Ture.

It is this trade-off that has split the business lobbyists into two main coalitions. IBM, for example, is part of the Coalition to Reduce High Effective Tax Rates. Members of this group are willing to sacrifice accelerated depreciation in order to reduce their relatively high tax rates.

IBM's Mattson said a host of special tax breaks that distort business decision making must be abolished so that corporate tax rates can be reduced. "Rates are first. We've got to bring them down," he said.

Opposing coalition

In the other camp are capital-intensive firms that give top priority to retaining the capital formation provisions of present law. This coalition includes the U.S. Chamber of Commerce, the National Association of Manufacturers, AT&T, GTE Corp., Honeywell, Inc., Chrysler Corp., Ford Motor Co., Exxon Corp. and Continental Airlines Corp.

In a recent letter to Treasury Secretary James A. Baker, the latter group argued that repealing the tax breaks would hurt business investments by raising the cost of capital, thus hampering economic recovery and U.S. competitiveness in world markets.

"I think it's inevitable that the business community is going to be deeply divided [on major tax reform]," observed John M. Albertine, a prominent Washington lobbyist and president of the American Business Conference, Inc.

The Treasury Department reportedly is considering retention of some tax incentives, such as a modified depreciation schedule, to woo more business support for tax reform. "A few squeaky wheels need to be greased," commented Rep. James R. Jones (D-Okla.).

Sen. Phil Gramm (R-Texas) advised the audience to lobby for those changes now, because it will be difficult to make major changes once a bill emerges from the White House. Subsequent efforts to win tax breaks will be derided by the public as special interest lobbying, he said.

ULTIMATE from page 67

12 years ago, UCS grew to $10 million in revenue last year and currently ships out about 1,000 IBM computers a month after reconditioning or refurbishing, LaRocca said. When dealers and lessors move a piece of equipment from one user to another, it generally requires refitting of various features and, in many cases, repair as well.

It recently began offering maintenance of Storage Technology Corp. equipment and plans at some point to become involved with Digital Equipment Corp. computers.

The company is also involved in equipment removal and reinstallations. LaRocca said he hopes to increase site-to-site involvement from the current 25% to 40% range to about 75%. UCS also warehouses equipment and optional features, enabling lessors and dealers to hold inventories of machines and options and to fill specific orders from stock.

UCS customers

Although its primary customer base is most of the 280 members of the Computer Dealers & Lessors Association, UCS also provides similar services in varying degrees to about 50 large end-user clients. UCS has accumulated a large stockpile of cables, and LaRocca said that with large data center moves, "the odds are that 90% of the cables in the floor [of the old site] will be the wrong size [for the new site]."

The firm sells its ability to turn over the equipment requirements of its customers rapidly. "By the time someone could get a quote from IBM [for refurbishing], we've done it and had the equipment installed for six months," LaRocca said.

A large part of business in recent months has been power-cycle conversions of European-manufactured IBM equipment being shipped to the U.S. to take advantage of the imbalance in currency exchange rates, according to LaRocca.

UCS had planned eventually to open refurbishing centers in four or five other metropolitan areas. "TRW is financing us to do that," LaRocca explained. Aside from the undisclosed financial terms of "an offer I couldn't refuse," LaRocca said the greatest change for him has been adapting to a large corporate environment.

"Things move a little bit slower than I'm used to, but that makes me think things out a little more than I might have done before," he said.

TRW deal attractive

LaRocca said four or five equipment manufacturers contacted him about establishing business relationships, but he said he was not convinced of their long-term commitments. He found the TRW offer attractive because he was convinced TRW would establish a presence in IBM equipment maintenance, and he saw an opportunity to set the tone for that presence and move UCS personnel into key TRW positions.

For TRW, Harnett explained, the deal provides expertise in large mainframe equipment that their Customer Service Division had not previously developed.

The UCS field service engineers that were absorbed into the TRW field organization will provide an opening into large data centers, he added.

If you're reading someone else's Computerworld, cut it out.

☐ **Yes** Please send me *Computerworld* for one year at $39 (that's $5 off the annual subscription rate of $44). I understand that my satisfaction is guaranteed and that I may cancel at any time and request a refund on the unused portion of my subscription.

Subscription Form

First Initial Middle Initial Last Name

Your Title

Company Name

Address

City State Zip Code

☐ Bill me.
☐ Payment enclosed.
☐ Charge to my credit card.
☐ AmEx ☐ VISA ☐ MC

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

(MC Only-List four digits above your name.) ☐☐☐☐

Expiration Date

Signature



If you are using a credit card, you can enter your order by calling
TOLL-FREE: 1-800-544-3712
(In Pennsylvania, call collect: 215-768-0388)

Address shown is: ☐ Home ☐ Business

☐ Check here if you do not wish to receive promotional mail.

Please indicate your business, title, and computer involvement below. Circle one number in Categories 1 and 2 and all that apply in Category 3.

1. **BUSINESS/INDUSTRY**
   End Users
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   65. Public Utility/Communication Systems/Transportation
   70. Mining/Construction/Petroleum/Refining
   75. Other User _____ (Please Specify)
   Vendors
   80. Manufacturer of Computers, Computer-Related Systems or Penpherals
   85. Computer Service Bureau/Software/Planning/Consulting
   90. Computer/Penpheral Dealer/Distributor/Retailer
   95. Other Vendor _____ (Please Specify)

2. **OCCUPATION/FUNCTION**
   11. President/Owner/Partner/General Manager
   12. VP/Assistant VP
   13. Treasurer/Controller/Financial Officer
   21. Director/Manager/Supervisor DP/MIS Services
   22. Director/Manager of Operations/Planning/Admin. Serv.
   23. Systems Manager/Systems Analyst
   31. Manager/Supervisor Programming
   32. Programmer/Methods Analyst
   35. OA/WP Director/Manager/Supervisor
   38. Data Comm. Network/Systems Mgmt.
   41. Engineer/Scientific/R&D/Technical Mgmt.
   51. Manufacturing Sales Reps/Sales/Marketing Mgmt.
   60. Consulting Management
   70. Medical/Legal/Accounting/Management
   80. Educator/Journalist/Librarian/Student
   90. Other _____ (Please specify)

3. **COMPUTER INVOLVEMENT**
   Types of equipment with which you are personally involved either as a user, vendor or consultant (circle all that apply).
   A. Mainframes/Superminis
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems

Computerworld Guarantee:
I understand that I may cancel my subscription at any time, and request a full refund of the unused portion of my subscription.

Fill in and return to: P.O. Box 1016, Southeastern, PA 19398

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

6A07-01

Announcing 8380 dual capacity disk subsystem

Field upgradeable from 8380 serial no.



Our 8380s—all of them—are field upgradeable to our newest enhancement, the dual capacity 8380E. So no matter when you joined the 8380 family, you have the best current technology, and a piece of the future.

That's because we've anticipated the future by designing our 8380 with the flexibility to accommodate changes in technology as they occur. Upgradeability is inherent. But we've done more than that.

Dual Port: Storage Technology pioneered Dual Port. This architecture set the industry standard and is now recognized as the best way to configure disk subsystems.

Thin-Film Heads: Based on our thin-film technology, the model E will double the capacity of our 8380 while maintaining the present footprint. Storage Technology assures reliable high-performance processing because we manufacture our own thin-film heads.

Cache: Our 8890 Sybercache intelligent disk controller bridges the performance gap between the CPU and the disk. Expanded to contain up to 72 megabytes of cache memory, the new cache management software further optimizes this product. Attached to the enhanced 8890 Sybercache controller, our disk products yield the best performance in the industry.



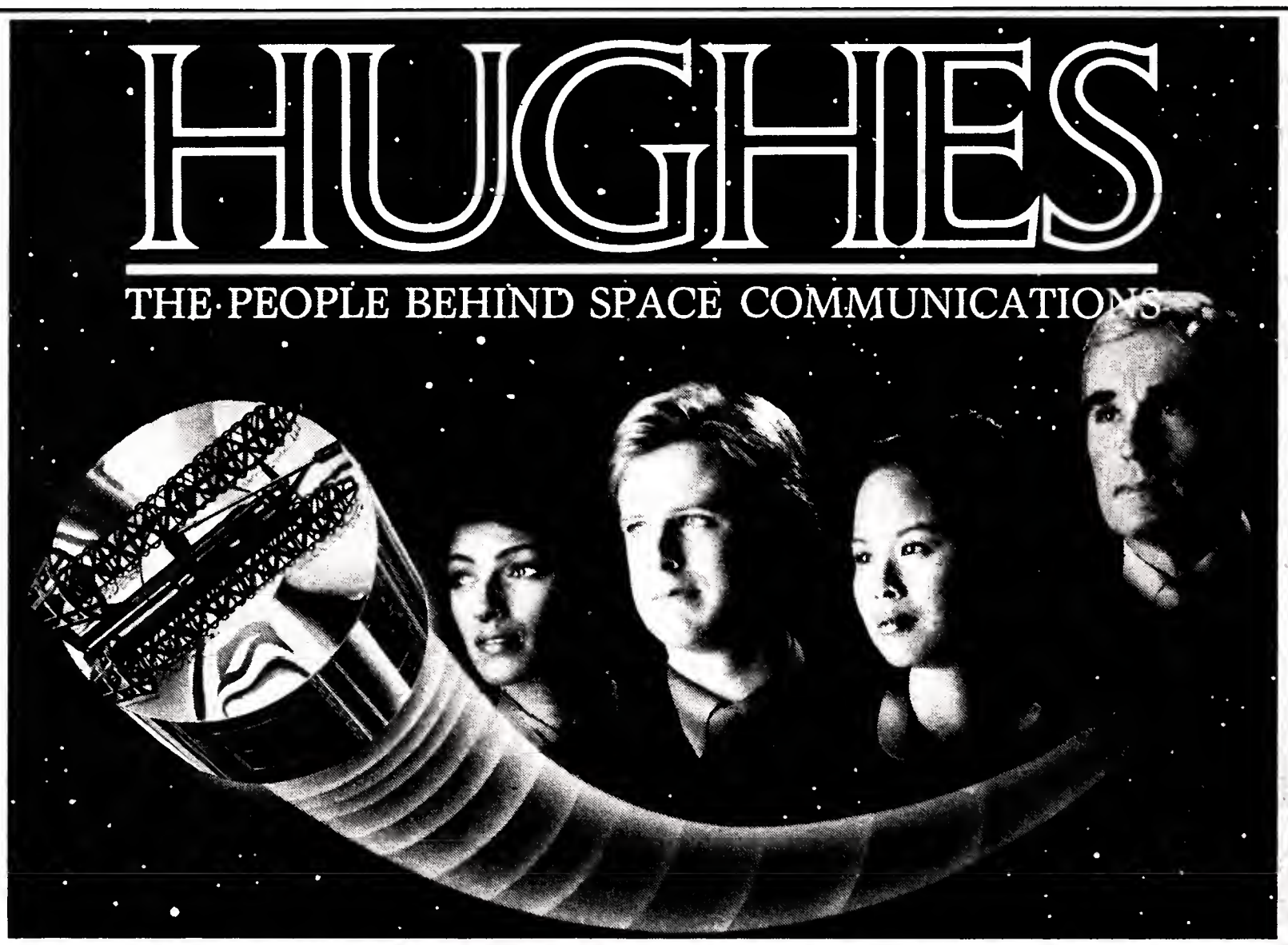
The 8380E is a dual-capacity enhancement to our family of disk products which already includes Dual Port, thin-film head technology and Sybercache. If you haven't invested in our 8380 technology yet, there's still time for you to join the family.
Storage Technology Corporation,
2270 South 88th Street, Louisville, Colorado 80028.

Call us at 1-800-STC-**8380**.

The new StorageTek starts now.

StorageTek

POSITION ANNOUNCEMENTS



THE PEOPLE BEHIND MANAGEMENT SYSTEMS

Hughes Space and Communications Group, responsible for the world's most advanced spaceborne communications equipment, is pushing data base technology to its limit. Based on IDMS, we are developing a highly sophisticated integrated data base that will revolutionize business management systems.

Add your IDMS experience to ours in the following positions:

Data Base Administrator

You will assist application development teams using IDMS. You will be responsible for creating logical IDMS database designs transforming them to physical databases and running schemes, subschemes and DMCL compilers. In addition you define and recommend database standards and procedures, review application design and programs for compliance and make necessary modifications. Position requires prior IDMS experience. Preferred candidates will have a BS in Computer Science or equivalent experience and an extensive background in data processing.

IDMS Applications Programmer

Supporting our increased development of applications products, you will work with IDMS-DC, ADS-O, ADS-A, ASF and other specialized tools to respond to our user needs. Our preferred candidate will have a year or more programming experience using IDMS.

IDMS Trainer

You will provide our end users and internal support professionals with the training and tools to stay abreast of all the latest IDMS developments. Our preferred candidate will have a BA degree, IDMS training experience, exposure to the aerospace industry, and working knowledge of all training techniques.

We offer a competitive salary and a comprehensive package of company paid benefits.

For immediate consideration, please send your resume to: Judy Jones, Professional Employment, Hughes Space & Communications, S41/A300, Dept. 859, P.O. Box 92919, Los Angeles, CA 90009. Proof of U.S. Citizenship Required. Equal Opportunity Employer.

HUGHES
AIRCRAFT COMPANY

SPACE & COMMUNICATIONS GROUP

Colorado School Of Mines
Director Computing Services

Responsibilities: The Director has primary responsibility for managing the university central computing facility. The computing center maintains the central academic, research, and administrative computer systems and provides support services to the educational and research user communities. The computing center is also responsible for maintaining clusters of personal computers located throughout the campus. Present facilities include DEC, GOULD, and WANG VS computer systems. The Director is expected to work effectively with administrators and faculty, and manage professional staff and part time student employees. In addition, the Director is expected to recommend computing policy and has oversight responsibility for planning of computing needs, including personal computers and data communication networks.

Qualifications: Candidates must have a minimum of five years management experience in an academic computing environment and sufficient technical knowledge to be able to make informed decisions about the acquisition of hardware and software. Applicants must demonstrate the ability to work with faculty and students at varying levels of expertise and the ability to convey and substantiate technical decisions to non-technical administrators and to faculty. Applicants must have appropriate degrees or equivalent experience. Salary and academic rank is commensurate with qualifications and experience.

Colorado School Of Mines is a state assisted institution and offers degrees through the doctoral level in Mineral Engineering and Science. Total enrollment is 2,700 students. The campus is located in Golden, 15 miles west of Denver.

Applications: Applicants should submit a letter of application, a current resume, and the names of three references no later than **May 17, 1985** to: **Dr. Samuel Romberger, Dean Of The Graduate School, Colorado School Of Mines, Golden, CO 80401.**

CSM is an Equal Opportunity Affirmative Action Employer

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as is the ability to travel or relocate.

Consulting and Contract Programming throughout the Southeast for nine years, DRC offers competitive salaries including bonuses and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company that "puts people first" DRC is your answer. Send resume to: 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call: BECKY FINLEY or IVA WALLS at: 404-455-7260 or toll free 1-800-241-6002

DRC
EOE

NEW ENGLAND

From the Sandy Beaches of Cape Cod to the Snowy Slopes of Vermont, WE COVER NEW ENGLAND!! The professionals from our 6 conveniently located offices will put you in touch with exciting career opportunities with clients that range from Fortune 100 Companies in Major Cities to Small Shops in quiet Country Settings. We Need Professionals With Experience On: Sys. 38 (25-30 openings at all times), IBM OS & DOS, Burroughs, Unix, "C", HP 3000.

Positions Inc.

117 Park Avenue, Suite 201, West Springfield, MA 01089
or Call Collect BILL MALLORY (413) 781-3412

NATIONAL OPPORTUNITIES $20-50,000

Both business and/or scientific applications-programming, systems analysis, data base design, data communications, systems programming and management. Positions available nationwide with some of the top Fortune 500 companies.

Forward your credentials in confidence; also include your geographic preference.

EXECUTIVE RESOURCES

SERVING THE NATION FROM DAYTON SINCE 1968

SUITE 215 - 3077 KETTERING BLVD.
DAYTON, OHIO 45439

SR. SYSTEMS PROGRAMMERS (MVS)

HBO & Company, a leader in the development of health care software systems, is currently seeking several promotable individuals qualified to support and maintain the systems programming function in a large IBM mainframe environment utilizing MVS, CICS, DL1, VSAM and VTAM.

Immediate openings are available at several facility management sites throughout the United States. These positions require 3+ years demonstrated MVS systems programming experience within an IBM mainframe environment. Experience utilizing SMP/E a plus; health care experience not required.

HBO & Company offers an excellent salary and benefits package. Please call or submit resume to: **Ted Mussatti, (312) 866-1500, HBO & Company, 990 Grove Street, Evanston, IL 60201.** Equal Opportunity Employer M/F/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

2 POSITIONS AVAILABLE

APPLICATIONS PROGRAM DEVELOPERS

Minitab, a leader in the development of statistical software, is looking for two highly qualified programmer analysts to develop and maintain new features of the Minitab statistical software. Candidates for both positions should have at least 3 years experience in programming, including Fortran programming of applications programs. Educational background: BA or BS required. Masters preferred, with degree in statistics, mathematics, computer science, engineering, or a field of application of statistics. Written and oral communication skills are essential.

GRAPHICS PROGRAM DEVELOPER

Position Involves programming and maintenance of Minitab's statistical graphics products, as well as assisting in the design and documentation and telephone consulting with users. Candidate should have experience with programming of graphics applications and/or device drivers. Familiarity with GKS and/or SIGGRAPH CORE standards is desirable.

STATISTICAL PROGRAM DEVELOPER

Position involves development and maintenance of statistical capabilities, as well as assisting in design, documentation, and telephone consulting with users. Candidate should have a working knowledge of statistics.

Minitab is located in a rural setting, 3 miles from The Pennsylvania State University, and offers a friendly, non-smoking working environment.

Send resume to
Minitab, Inc., Dept CW2, 109 ABL; University Park, PA 16802.

NJIT
Systems Programmer/ Analyst

NJIT seeks career oriented individuals looking for a challenge to participate in programming and systems development of computer mediated communications systems. Qualifications: 3 yrs. experience in IBM MVS/CMS and SNA; C language programming; ability to build, test programs and document work. BS in computer science or equivalent required. AA/EO employer.

Send resume:
Personnel Box CIAT
NEW JERSEY INSTITUTE OF TECHNOLOGY
Newark, NJ 07102

Systems Programmers and Programmer/Analysts:
EDS Wants to Challenge Your Talents.

THE EDS AND GM ALLIANCE HAS CREATED A TECHNICAL ARENA THAT OTHER COMPANIES CAN ONLY ENVY.



The alliance of Elecronic Data Systems (EDS) and General Motors is creating major career opportunities. As a SYSTEMS PROGRAMMER or PROGRAMMER/ ANALYST, your skills and abilities will be challenged.

EDS is offering you IMMEDIATE opportunities to enjoy hands-on experience with truly state-of-the-art hardware and software. This state-of-the-art experience will ensure that your skills are kept as current as possible. Also, EDS offers training programs that have become models for the industry and are geared to prepare you for the performance that ensures success. As one of IBM's largest customers and one of the nation's largest hardware users, EDS is creating one of the most automated work environments in the business world today. This is your once-in-a-career opportunity to become involved in the leading edge of technology.

EDS AND GM ARE PIONEERING TECHNOLOGY. AND SO CAN YOU.

EDS and GM are world-renowned leaders in technology. EDS ensures this leadership by continually upgrading our facilities with the most advanced hardware and software available. And since we employ components that accommodate change, our operating systems are never limited by technology of the past. You benefit as a professional since you will never be hindered by out-of-date equipment. The best technology of tomorrow is built on the best technology of today. And that's all you find at EDS.

SYSTEMS PROGRAMMERS AND PROGRAMMER/ANALYSTS: OUTSTANDING CAREER OPPORTUNITIES.

We have IMMEDIATE career opportunities for professionals who are interested in moving the industry onward. If you are a SYSTEMS PROGRAMMER with two years experience in an IBM, IBM-compatible or DEC/VAX environment with a solid working knowledge of ALC or ASSEMBLER, we have challenges in the areas of VTAM, VM, IMS, IDMS, and MVS.

If you are a Programmer/Analyst with two years experience in an IBM or IBM-compatible environment with a solid working knowledge of COBOL, PL/1 or ALC, EDS has the ideal environment to challenge your skills.

YOUR CAREER GROWTH: AT EDS, WE DON'T TAKE YOUR TALENT FOR GRANTED— WE CHALLENGE IT, WE RESPECT IT AND WE NURTURE IT.

EDS knows that new ideas and new technology are only as good as the people who create them. That's why developing the potential of our employees is a continuing priority. We believe our strength is enhanced when our employees develop new skills and accept greater responsibilities. Therefore, we have created an environment that lets you build your future by the knowledge and skills you acquire — not by rank or seniority. At EDS, you control your own future.

Act now, advance the industry while experiencing the technological challenges and advantages EDS can offer you. Send your resume in confidence to:

ELECTRONIC DATA SYSTEMS CORPORATION
755 W. Big Beaver
Suite 310, Dept. 09-0485-03
Troy, MI 48084

EDS

Electronic Data Systems Corporation

An Equal Opportunity Employer.

IBM 38

4 WAYS TO ADVANCE YOUR CAREER

Contact:

Tom Redding	Bobbie Navratil	Phyllis Marshall	Deanna Gear
Dunhill of Sacramento	Dunhill of High Point	Dunhill of Midland	Dunhill of Albuquerque
2422 Arden Way	P.O. Box 6012	2101 West Wall St.	1717 Louisiana NE
Suite #28	High Pt.	Suite 1	Suite #218
Sacramento, CA 95825	NC 27262-6012	Midland, TX 79701	Albuquerque, NM 87110
(916) 929-3475	(919) 885-9075	(915) 683-4846	(505) 262-1871

Nationally, we represent companies seeking IBM 38 Professionals—Programmers through Management—Experience required.

Don't wait Contact the above office nearest you. We have the position for you that will afford the next imoortant step in your career.

Dunhill Personnel System
A Subsidiary of Transworld Corporation

Think of us as an extension of your business.

Average Temp - 72°
No State Income Tax
SUNSHINE STATE

Florida's DP community is Booming!!
Our clients need your expertise

ANALYSTS/PROGRAMMERS

PL1 or Cobol w/IMS or CICS	To $36K
Data Security RACF, ACF-2	To $40K
Cobol w/FOCUS or ADABAS	To $37K
MVS Cobol w/Banking Sys.	To $35K
8080, C, PASCAL	To $40K
ATE Engineers	To $40K

SOFTWARE/INTERNALS

MVS or VM, CICS or IMS	To $40K
ACF/VTAM Sys Prog	To $39K
DBA's, IMS, ADABAS, Model 204	To $40K

Other Positions Available Throughout Fl. & SE

AVAILABILITY, INC.
813/872-2631
Dept. C, P.O. Box 25434
Tampa, Florida 33622

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr.
- Technical MVS Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Lans C Unix
- Microprocessor Software
- Systems & Programming Mgr.
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems
- PC Micros

BRUCE A. MONTVILLE
Managing Partner

TOLL FREE
1 (800) 258-7328

EXETER 2100™
National Recruiting Consultants
(603) 926-6712

COMPUTER PARK, P.O. Box 2120
HAMPTON, NH 03842

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

general employment enterprises, inc.

SERVING THE NATION SINCE 1893
COAST TO COAST NETWORK REFERRAL SERVICE

We specialize in Data Processing, Engineering, Electronics, Management Services, Office Services, Financial & Executive Placement.

SYSTEMS PROGRAMMER
$40,000-$45,000
Progressive Advancement
Staff opportunity is at your fingertips here! Be in a team environment. Be involved with MVS Internals. Do fine tuning and performance monitoring.

TELECOMMUNICATIONS ANALYST
$32,000-$40,000
Tailored for the person strong in computer and network operations! MVS/XA environment a real plus. Be the trouble shooter on systems utilization.

OPERATIONS RESEARCH
$35,000-$60,000
High level activity in a "Think Tank" atmosphere! A free wheeling open-end management "plum" using your DEC/VAX. Exposure in "C", Unix, Poscal, and Assembler Ideal!

MANAGER
Technical Support
$45,000-$55,000
Be the D.P. Quarterback directing all technical D.P. activities with the emphasis on software selection. It is a fast paced expanding operation that will utilize your leadership and motivational skills. High visibility excellent promotion potential.

CLIENT LIAISON
Field Specialist
$30,000-$50,000
Staff status on special assignments! Capitalize on your IBM OS/MVS background. Be involved with on site trouble-shooting and strong customer service activities.

OPERATIONS MANAGER
$35,000-$40,000
The ideal opportunity to capitalize on your financial operations background! Manage an IBM/OS installation. The person up through the ranks can handle this

New Development PIONEER
$35,000-$42,000
Step in as the systems analyst and supervise an analyst staff in the area of manufacturing packages. Your Cobol exposure is an excellent base to build your management future on.

Manufacturing Analyst
$30,000-$45,000
There's Project Management in the future! Capitalize on your Univac 1100 expertise in a manufacturing environment. Be company liaison with product users.

Applications Programming Manager
$30,000-$42,000
The seasoned "Pro" with hands on knowledge of Cobol Programming will find this to their liking! A unique opportunity to capitalize on your systems design. Step in—be in charge.

Systems Engineer
$40,000-$46,000
A career "plum" for the practical practitioner! Have a hand in all facets of operating software from planning through implementation. Ideal for the problem solver who enjoys personal challenges.

MIS DIRECTOR
$30,000-$40,000
A growing IBM 38 installation needs your leadership and communications skills! Take charge of planning. Hardware/Software development, budgeting and user contact. It's a stepping stone to a V.P. position.

PROGRAMMER ANALYST
Concepts - Ideas
$30,000-$40,000
From idea to concept through development into implementation! Perfect for the creative talent whose background is in finance and manufacturing applications. Familiarity with IBM Mainframes Ideal!

FAR WEST

Phoenix, AZ 65012
3443 N. Central Ave.
602/265-7800

Palo Alto, CA 94303
2471 E. Bayshore Rd.
415/494-3441

Woodland Hills, CA 91367
6312 Variel, Suite 201
818/703-5550

Walnut Creek, CA 94596
675 Ygnacio Valley Road
Suite 8206
415/934-9550

San Francisco, CA 94111
444 Market Street
415/981-6440

San Jose, CA 95126
1550 The Alameda
408/288-8700

Los Angeles, CA 90010
3699 Wilshire Plaza
213/386-4630

San Francisco, CA 94105
One Market Plaza
415/896-0511

Woodland Hills, CA 91367
6312 Variel, Suite 216
818/703-5585

Huntington Beach, CA 92646
2130 Main Street
714/960-2431

CENTRAL AND MIDDLE WEST

Columbus, OH 43215
88 E. Broad St.
614/228-5192

St. Louis, MO 63101
720 Olive Street
314/231-7400

Arlington Heights, IL 60005
85 W. Algonquin Rd
312/439-1233

Indianapolis, IN 46204
5 E. Market St.
317/636-2261

Naperville, IL 60540
350 W. Shuman Blvd.
312/983-1233

Chicago, IL 60606
150 S Wacker Dr., Ste. 600
312/853-1233

Chicago, IL 60606
150 S Wacker Dr., Ste. 775
312/782-6062

Detroit, MI 48226
1200 Sixth St.
313/963-8470

NORTHEAST

Boston, MA 02116
545 Boylston St.
617/267-9119

Woburn, MA 01601
444 Washington St.
Suite 304
617/938-7950

Philadelphia, PA 19103
8 Penn Ctr. Plaza
215/564-3101

Philadelphia, PA 19102
3 Penn Ctr. Plaza
215/569-3226

SOUTHWEST

Dallas, TX 75240
5501 LBJ Frwy.
214/788-4462

Dallas, TX 75201
Plaza of Americas
214/969-7665

Houston, TX 77054
2640 Fountainview
713/977-3677

Dallas, TX 75206
8350 N. Central Exp.
214/987-0762

Houston, TX 77006
1235 N. Loop West
713/861-6588

CANADA

Hamilton, ONT. L6P-1A2
100 King-Stelco Towers
416/527-9201

Etobicoke, ONT. M9C-4Z5
One Eva Rd., Suite 100
416/622-8843

SOUTHEAST

Orlando, FL 32804
600 Courtland St
305/629-9222

Atlanta, GA 30303
225 Peachtree St.
404/681-3810

Tampa, FL 33609
5401 W. Kennedy Blvd
Suite 422
813/873-8123

general employment enterprises, inc.

Corporate Offices, 150 S. Wacker Dr., Chicago, IL
Listed on American Stock Exchange
1-800-922-1234

ACADEMIC COMPUTING

1. ACADEMIC SERVICES COORDINATOR (RENO)
Uses services and consulting for academic and research communities; liaison between UNSCC and campus facilities. Masters Degree required. Salary: up to $28,000.

2. SOFTWARE SYSTEMS ANALYST (LAS VEGAS)
Technical consulting and software support for VAX/VMS and Harris/VOS operating systems and applications. Bachelors Degree required. Salary: up to $21,615.

(There is the possibility of an 11% increase to the above salary pending legislative action.)

Application deadline: extended to June 1, 1985.

For further information and a copy of the position announcement call (702) 739-3557 or write to:

Lawrence P. Melberg
Assistant Director
University of Nevada Systems Computing Center
4505 Maryland Parkway
Las Vegas, NV 89154

The University of Nevada Systems Computing Center is an Affirmative Action, Equal Opportunity Employer.

FIRMWARE DEVELOPMENT ANALYST

Firmware Development Analyst needed to conduct logical analysis of scientific and other technical problems and formulate mathematical models of problems for solutions by digital computer. Design, develop, and analyze microcode using PLM 80, PLM 8086, Z80 and 8086. Assembly language to interface with graphic data input devices such as digitizer and printer. Develop algorithms to facilitate real time operations on display list communicated from mainframe computer (Wang VS operations series) for dynamic three dimensional graphic structures. Requires a Master of Science degree in Computer Science and one year directly related programming experience. Education background must include heavy emphasis on higher mathemathics and statistics, including curve fitting algorithms development for interpolation of missing data. Must have knowledge of lagrange polynomial and least square methods. 40 hour work week. $35,000 per year. Apply at the Texas Employment Commission, Dallas, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. Job order #3943633. Ad paid by an Equal Employment Opportunity Employer.

MIS DIRECTOR - CHARLOTTE, N.C. POP. 340,000 - $40,312 - $56,437 DOQ - Directs the operations and services of a large MIS Department which include systems analysis and programming technical support, computer operations, and administrative support functions and services. Director exercises considerable judgement and initiative in achieving work reviewed by City Manager. Requires extensive, progressively responsible experience in computer systems analysis and data processing management; and a B.A. or B.S. in Computer Science or related. Desire a creative manager with strong human relations and communications skills. Deadline for applying is Friday, May 17.

Send Resume with salary history to:

Personnel Department
City of Charlotte
600 East Trade Street
Charlotte, N.C. 28202

AN EOE M/F/H

PROGRAMMER
CICS/IDMS/VSAM INSTRUCTORS NEEDED

Part-time/full-time, day/evening for in-house and public courses. Excellent salary. Please call Mike (212)777-5040 or send resume to:

ICCS, Inc.
915 Broadway, 3rd Floor
New York, NY 10010

FREE RESUME SERVICE

Even though we are a recruiting firm, we do offer a free resume service. Write or call for a resume preparation form. Complete the form and mail to us and we will return a completed resume to you. This is a confidential service with no obligation.

Call 919-378-1261
Adkins and Associates, Limited
P.O. Box 16062
Greensboro, NC 27406

MANAGER

Systems Programming
SOUTHERN CALIFORNIA

Litton Computer Services is one of the nation's leading data processing organizations, an independent computer services company, innovative and responsible to the needs of both government and private industry. We operate the latest IBM CPU's and equipment (a 3081, 3084 and a 4341) and are currently running MVS/XA.

The position is for an extremely people-oriented Manager, with strong management and communication skills, and a real ability in interpersonal relations. Requirements include a minimum of 4 years experience in the following areas: MVS/XA or SP internals, strong JES, JES 2, SMP 4, project planning, especially with IPCS. Should also have experience in multi CPU environment, system modification & sysgens. MSX helpful, plus an applicable degree and proven management skills.

Litton Computer Services offers the opportunity to work with the newest state-of-the-art equipment, in a relaxed atmosphere conducive to both personal and professional growth. We are located in Woodland Hills, one of Los Angeles' finest suburban communities, only a few blocks off the Ventura Freeway, which provides quick access to educational, recreation and cultural facilities.

For immediate consideration please send resume (WITH SALARY HISTORY) to:

Sarah Jackson

P.O. Box 4040, Woodland Hills, CA 91365-4040

Litton Computer Services

Equal Opportunity Employer M-F

PROGRAMMER ANALYST/MARKETING INFORMATION SYSTEMS

Seeking an individual to participate in the design and implementation of Marketing Information Systems. Desirable candidate must have 4-6 years experience with order processing, sales analysis, and sales forecasting systems. Project involves the integration of personal computers, communication links to customers, and bar coded labels with main frame applications. Knowledge of S/34, S/36, and MAPICS desirable. Languages: COBOL, RPG, and BASIC.

Nalge, a division of Sybron, is a leading manufacturer of plastic laboratory products. We offer competitive compensation and benefits packages. Interested and qualified candidates should submit resume to:

Barbara McGraw
NALGE COMPANY
Division of Sybron Corp.
Box 365
Rochester, NY 14602

SYBRON | Nalge

We Are An Equal Opportunity Employer M/F

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

INSTRUCTOR OF COMPUTER SCIENCE

Western Wyoming Community College announces an opening for the above position. Duties to commence August 20, 1985. This is a permanent, 9-month per year position. The incumbent would teach courses such as BASIC, RPG II, Computers in Society and other high level programming languages. A Master's degree in Information Systems, Computer Science or Business Administration is required, together with recent relevant work experience and data processing teaching experience at the post secondary level, (if the Master's degree is in Business Administration, the undergraduate program must have included at least 18 credit hours in programming-/language/data processing subjects). Salary and benefits are competitive. Send resume, three letters of recommendation and academic transcripts as soon as possible to:

For further information, please contact:

Personnel Office
Western Wyoming Community College
P.O. Box 428,
Rock Springs, WY 82902-0428
(307) 382-2121, Ext. 122

An Equal Opportunity/ Affirmative Action Employer.

HP 3000 ANALYST

Prestigious research firm in Upper NY State needs a high profile sr. analyst w/HP3000 bkgrd., min. 3 yrs. exp. & excellent interpersonal skills. Position reqs. significant user interface. A superb career oppty. in beautiful living area near Albany. To $40,000.

ROBERT HALF
OF BUFFALO, INC.
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801
Personnel Agency

IN SAN FRANCISCO IT'S SPRING YEAR 'ROUND!

DATA PROCESSING PROFESSIONALS skilled in Main Frames, Minis or Micros – DATA-BASE or ON-LINE SYSTEMS – Consider a move to the beautiful SAN FRANCISCO BAY AREA.

Career opportunities offering CHALLENGE, GROWTH and REWARDS.

LOGICAL OPTIONS
Incorporated Agency Est. 1975
One Market Plaza, Spear Tower, Suite #2014A
San Francisco, CA 94105 • (415) 777-3900

National's Series 32000™: First In Design, First To Production, First To Market.

Now You Can Be The First To Build On It.

You're a software innovator with extensive UNIX™ experience. You want to work with emerging technologies. And the only opportunity you're interested in is the opportunity to make a difference.

You belong at National Semiconductor's advanced product development center in Portland, Oregon. We're developing a UNIX operating system performance-tuned to Series 32000-based board-level computers. Then we'll expand it to include graphics and network support within the AT&T System 5 framework.

It's one of software's most exciting challenges. To meet it, we need software development professionals who possess a BS/MS in CS or EE, or equivalent, plus at least three years of experience in one of these areas:

UNIX Internals

You will specify hardware design and implement UNIX on new hardware.

LAN Implementation

Experience designing and developing Ethernet systems, plus implementation knowledge of TCP/IP, ISO protocols important.

Graphics Kernel Development

You will define and implement hardware to support GKS or ANSI CORE graphics kernels and applications.

Utilities

You will port UNIX utilities to new hardware and software.

Diagnostic Programming

Work with design and test engineering to write user-friendly hardware diagnostic programs.

CAD Support

Put your Pascal programming experience to work producing programs to make CAD equipment easier to use.

Software Support

General OS experience plus knowledge of UNIX operating system needed to develop operating system, networking and graphics packages.

The Pleasures of a Start-Up Without the Pains of Growing Up.

What can we offer you? High energy. Top rewards. Unsurpassed technical resources. In fact, all you expect from an invigorating start-up environment. Plus the added benefit of solid support from National Semiconductor — a technological leader for nearly twenty years.

To apply, send your resume to NATIONAL SEMICONDUCTOR, Portland Development Center, Professional Employment, Dept. CW, 15201 S.W. Greenbrier Pkwy., Beaverton, OR 97006.

*UNIX™ is a trademark of Bell Laboratories.

Together, We'll Do Even More.

National Semiconductor

Programming

SR. PROGRAMMER/ANALYST

Design and Implement Computer Systems for MANUFACTURING FACILITIES

A Fortune 100 division, located in Vancouver, WA., just outside of Portland, OR., in the beautiful and AFFORDABLE Pacific Northwest, has an immediate opening for a qualified professional to assume key responsibilities.

As Senior Programmer Analyst, you will analyze, design and code new manufacturing and financial computer systems, as well as perform some maintenance on existing systems. Additionally, you will coordinate and supervise short and long term projects of other Data Processing Department professionals. The manufacturing applications include General Ledger, Product Costing, Production Planning and Inventory Control.

The ideal candidate will have at least four years of relevant experience, with some in a manufacturing environment, and three years of interactive programming in COBOL. Experience with IBM S-34 or S-35 and DBMS is preferred. BSCS or equivalent experience necessary.

For prompt consideration, please forward your resume, in complete confidence to:

CW-B4635, Computerworld, Box 880, Framingham, MA 01701

An Equal Opportunity Employer

UNIVERSITY OF WAIKATO HAMILTON, NEW ZEALAND

Director of Computer Services

The University of Waikato has a vacancy for Director of Computer Services. The Director is responsible to the Vice Chancellor and is a member of a computer committee which makes recommendations on policy matters. As the University aims to maintain state-of-the-art services, the Director should be able to provide leadership in computer utilisation on the campus. He or she should have appropriate academic qualifications and professional experience, including proven administrative skills. The Director is responsible for a centre and for some staff seconded to academic departments and other areas. The current establishment is 7 professionals and 8 other staff. The salary will be in th range NZ dollars 32,323 to NZ dollars 38,377 per annum and the N.Z. government superannuation is available. The conditions of service are those for professional non-academic staff. Details of the application procedure and further information are available from the Association of Commonwealth Universities (appts), 36 Gordon Square, London WC1H OPF, England, or the Registrar, University of Waikato, Private Bag, Hamilton, New Zealand. Applications close with the Registrar on 22 May 1985.

SOFTWARE DEVELOPMENT FOR IMAGING

Major new product is creating growth opportunity for several software people with various levels of expertise.

We need expertise in Applications Development, Image Processing, I/O Drivers and Assembler Language. Combination of the above disciplines are preferred and a Computer Science degree is required.

Our salary/benefits package is competitive & a group incentive is included. This is a Bell & Howell effort. We are an equal opportunity employer through affirmative action. Please send resume and salary history to:

CW-B4633, Computerworld
Box 880, Framingham, MA 01701

BELL & HOWELL

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

M.I.S. PROFESSIONALS
Share in our Growth in '85

Explore these exceptional opportunities to join the momentum and growth of one of the most respected M.I.S. Teams in the industry. Apply your innovative talents. Challenge your expertise. Come share the pride, success, and dedication that has carried us to the top! Exceptional growth has created new and exciting opportunities for M.I.S. Professionals

Princess House, Inc. is a leading national corporation specializing in crystal, china and metal products with almost 1,000 employees. We are situated on over 40 acres in North Dighton, MA (just outside of Taunton) and are easily accessible from Routes 195, 24, and 140.

If you're analyzing opportunities for career challenge and advancement, Princess House measures up.

Exceptional business growth has created a need for the following major systems:

ORDER PROCESSING
Development of a major, on-line order processing system to support the unique requirements of Princess House, Inc. Project scope will include all functions from receipt of an order to customer shipment.

MANUFACTURING
Development of a manufacturing business support system to service on-site manufacturing and corporate facilities. The system will be integrated with the new order processing system and existing applications.

CUSTOMIZED APPLICATIONS
Development and support of customized, in-house applications. Unique marketing strategies of Princess House are supported by specialized systems requiring technical and functional enhancement and growth. Unique incentive payroll processing requirements must also be met.

Our growth requires the addition of M.I.S. professionals to assume the following responsibilities:

PROJECT LEADERS
Lead major projects through all phases of the systems development life cycle. A BS/BA or equivalent and 4–7 years of M.I.S. experience is required. Proven skills must include project management and effective communications.

SYSTEM ANALYSTS
Perform extensive systems analysis and design while working with the users to translate business needs into system requirements. A BS/BA or equivalent and 3–6 years of M.I.S. experience is required. Proven skills must include systems analysis and design and effective communications.

SR. PROGRAMMER ANALYSTS/ PROGRAMMER ANALYSTS/ PROGRAMMERS
Plan, design, program and implement complex system enhancements and new applications. An AS/BS/BA or equivalent and 1–5 years of IBM System 38 experience is required. Level is dependent on education, experience and the strength of technical, analytical and professional skills.

As a subsidiary of a Fortune 100 company, we can offer a truly exceptional benefits package that includes full Tuition Refund, Dental Assistance Plan, Stock Ownership Plan, and a Savings & Investment Plan with a 401(k) feature.

For immediate, confidential consideration, please submit resume to:

Personnel Department
PRINCESS HOUSE, INC.
A Colgate-Palmolive Company
455 Somerset Avenue
N. Dighton, MA 02764
Equal Opportunity Employer M/F/H

Princess House, Inc.
A COLGATE-PALMOLIVE COMPANY

MVS SYSTEMS PROGRAMMER

Syracuse University Academic Computing Services has an opening for a senior programmer/analyst whose primary responsibility will be the installation and maintenance of the MVS/SP (JES2) operating system on an IBM 4341 computer.

Applicants must have a Bachelor's degree and a minimum of one year of operating system experience, or an equivalent combination of education and experience. Knowledge of SMP and PUT process is preferred and familiarity with VM/CMS is a plus.

Syracuse University's benefits include competitive salaries, advanced degree opportunities, dependency scholarships, and generous vacation and retirement plans.

Closing date for applications is May 8, 1985. Send resume to: MVS Search Committee, Syracuse University, Personnel Department, Skytop Offices, Syracuse, New York 13210.

Syracuse University is an Equal Opportunity Affirmative Action Employer.

UNIX*/C

SDA, in business since 1968, is one of the most sought after DP consulting firms in America. Our continued expansion means exceptional career opportunities for you.

If you're a DP professional with experience developing systems using UNIX*/C, we'd like to hear from you. (Foreign experts requiring visa sponsorship are welcome to respond.)

We offer excellent salaries plus expenses, health, dental and life insurance coverage, as well as tuition reimbursement. Relocation negotiable. Please call **(201) 687-5910** or send your resume to:

Sharon C. Diller
Mgr., Human Resources
Software Design Associates, Inc.
1620 Route 22
Union, NJ 07083
Equal Oppty Employer M/F/H/V
*UNIX is a TM of ATT-Bell Labs

PRODUCT ANALYST

One of the nation's largest independent equipment leasing companies has an opening in its Product Analysis Department for a detail-oriented person with analytical background or training. The position involves the appraisal of high tech equipment, residual value determination and trend analysis. Knowledge of Information Systems Equipment and/or Telecommunications and/or an engineering background a must. Experience in third party leasing a plus.

Position requires excellent communication, mathematical and analytical skills. Experience can be substituted for education. If you are looking for an exciting and responsible position, send resume and salary requirements to:

Finalco, Incorporated
Personnel Department
P.O. Box 3606
McLean, VA 22103
EOE

MIRGRATE SOUTH!!

UNIX/C (software dev.)	To 38K
PASCAL Programmer/Analyst	To 36K
CICS/IMS/COBOL/PL-1 P/A's (MVS)	To 34K
Systems Prog. (MVS, IMS, CICS)	To 45K
Data Communications Analyst	To 39K
S/38 Project Leader	To 35K
DOS/COBOL Programmer Analyst	To 29K
VM Systems Programmer	To 35K
Tech. Support Mgr. IBM/MVS	To 45K
Tech. Support Mgr. IBM/DOS	To 45K
Data Base Adm. (IMS or IDMS)	To 43K
Mini-Micro Software Specialist	To 37K
Systems Programmer (VTAM/SNA)	To 35K

We've completed literally thousands and thousands of assignments in our 37 years in the business. We know the marketplace and can help you if you want it. All fees and expenses paid.

Jim Morgan/Mark Berger/
Susan Hall 901/761-4560
EXECUTIVE PERSONNEL CONSULTANTS
606 S. Mendenhall
Memphis, TN 38117

DP CONSULTANTS

Our Big 8 CPA clients in the Mid-South, S.E. and S.W. have asked us to find professionals with business systems applications experience on PC's through mainframes. If you have the technical credentials and good business development skills, confidentially contact us ASAP.

ROMAC®
One Commerce Square, Ste. 2550
Memphis, TN 38103
(901) 523-0500

MANAGER CHECK PROCESSING

To manage Proof Department, Transit Department, Float and ACH. 30 to 40 personnel reporting with appropriate project managers. DOS shop to convert to OS. Senior management level position to 45K. Please mail resume or call collect for interview.

Executive Consultants
Banking Specialist
1600 Fairfield
Suite 101
Shreveport, LA 71101
(318) 222-1000

DANIEL
SOFTWARE SERVICES POSITIONS

DANIEL MAINTENANCE AND INDUSTRIAL SERVICES COMPANY, a division of Daniel International Corporation, one of the largest engineering/construction/maintenance firms in the nation, has the following key openings. These positions will provide software support to our maintenance project clients.

CLIENT SUPPORT MANAGERS
The successful applicants must have the following qualifications:
- 15 years DP experience
- DEC VAX/IBM hardware experience
- Manufacturing and/or construction systems
- Management/Supervision/Budget experience
- Software industry experience, and
- Profit/Loss responsibility

These positions are located in both the Long Beach, California area and our corporate headquarters in Greenville, SC.

SOFTWARE SALES REPRESENTATIVE
The successful applicant must have the following qualifications:
- 10 years DP experience
- IBM and/or DEC hardware experience
- Manufacturing and/or construction systems
- Software industry marketing experience
- Good presentation skills/experience
- Entrepreneural spirit, and
- Ability to work independently

MANAGING ANALYST
The successful applicant must have the following qualifications:
- 10 years DP experience
- IBM and/or DEC experience
- Manufacturing and/or construction systems
- On-line database systems experience
- Software industry experience
- Project management experience, and
- Hardware/software installation experience

The Software Sales Representative and Managing Analyst positions are available in our corporate headquarters in Greenville, SC.

In addition to a nationally competitive salary structure, we offer many improved benefits. These include short-term disability, salary continuation, accidental death coverage, medical insurance and corporate retirement plan.

To inquire about these and other opportunities, send your resume including salary history and requirements in complete confidence to **Bonita Wellington, DANIEL, Daniel Building, Dept. 2-5248, Greenville, SC 29602.**

IMMEDIATE OPENINGS
SR. SOFTWARE ENGINEERS
SOFTWARE ENGINEERS
(Min. 3 yrs. experience)

Join the world leader in Computerized Mapping/Graphics and Data Base Management Systems and Services.

Applicants should have experience in:
Minicomputers
Fortran and/or PL/1
Structured analysis, design and programming techniques
Applications design and development
Data General software and hardware

Outstanding career opportunities and challenging assignments.
Competitive salaries and comprehensive benefits package.
Relocation allowance (to Colorado)

Send your resume, with salary history and requirements to:
Laura Tornaquindicci, *Personnel Manager*

BUTLER COMPUTER GRAPHICS
Dept. CW, 5200 East Evans Avenue, Denver, CO 80222
An Equal Opportunity Employer
M/F/H/V

System Developers
800-231-5920

Inviting resumes from individuals in the more highly technical computer related vocations such as: PHD Computer Scientists, Operating System Developers, Data Base Developers, Porting Specialists, Networks and Telecommunications, Architecture, Artificial Intelligence, Graphics Systems Developers, Microcoders and Firmware Developers, Compiler Development, etc. Special interest in emerging technology such as novel architecture, UNIX, ADA, etc. Similar interest in scientific applications developers including military, process control, data acquisition, telemetry and communications, CAD/CAM, simulation and modeling, etc.—we are a professional employment firm managed by graduate engineers. Fees are paid by the employer. All geographic locations. Send resume or call D. A. Redwine and ask for our free resume workbook & career planner.

Scientific Placement, Inc.
P.O. Box 19949 CW Houston, TX 77224 713/496-6100
UNIX is a trademark of Bell Labs

SOFTWARE PROFESSIONALS

Rand Systems Corporation, an eleven year old software services firm, is constantly looking for talented professionals with the following skills:

- **IMS DB/DC, CICS, Cobol, PL/1, RAMIS, FOCUS, IDMS, ADS/O**
- **VAX/VMS, PDP-11, IBM SYSTEM 38/36/34**
- **DEC DIBOL, PASCAL**
- **ENGINEERING/SCIENTIFIC, FORTRAN**
- **MICROCOMPUTER ENGINEERING, M6800/6500/6800**
- **DEC MANUFACTURING SYSTEMS**
- **REAL-TIME PROCESS CONTROL**

Rand Systems Corporation is preparing for another period of major growth in our exciting industry. We provide excellent benefits (including Blue Cross Medical/Dental, year-end bonus, and over-time pay. Please call Mr. Rand at 313-855-6877 or send resume:

RAND SYSTEMS CORPORATION

RAND SYSTEMS CORPORATION
7071 Orchard Lake Road, Suite 305
West Bloomfield, MI 48033
(313) 855-6877
All replies held in strict confidence

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

UNIQUE POSITION

- ARE YOU AS COMFORTABLE WITH A SOLDERING IRON AS WITH A COBOL MANUAL? WITH A IBM MAINFRAME AS WELL AS A ROBOT OR A MICROCOMPUTER?
- DO YOU ENJOY BEING TOTALLY RESPONSIBLE FOR A PROJECT FROM BEGINNING TO END?
- CAN YOU SPECIFY, DESIGN, PROGRAM AND TRAIN USERS ON A COMPUTER SYSTEM?
- DO YOU LIKE TO LEARN NEW TECHNIQUES AND THEN BE RESPONSIBLE FOR APPLYING THEM?
- DO YOU ENJOY DESIGNING AND BUILDING CIRCUITRY FOR NEWER APPLICATIONS?

IF THIS SOUNDS LIKE YOU READ ON:

Our technology Evaluation and Support Department is looking for talented, creative individuals to help this major Southern California Corporation explore the future. This person must be able to work on small innovative computer and technology projects involving BASIC, FORTRAN, COBOL, "C", DBASE II languages on both IBM mainframes and CP/M or UNIX Type Microcomputars, Robotics and video systems.

If interested, please submit resume and salary history to:

P.O. Box 27790
Dept. 5153
Los Angeles, CA 90027

Equal Opportunity Employer

Project Mgrs **Systems Pros**

ACP/TPF

Opportunities in our Arizona, Florida & NY Branch Offices

SDA, an international DP consulting firm, is steadily expanding and seeking professionals with software and applications development experience in an ACP or TPF environment, preferably using Assembler language. (Foreign experts requiring visa sponsorship are welcome to respond.)

We offer excellent salaries plus expenses and an extensive company-paid benefits package. Relocation negotiable. Please call (212) 741-5200 or send your resume, in confidence, to:

Norman Merkin
Director, Human Resources

Software Design Associates, Inc.

71 Fifth Ave.
New York, NY 10003

A National Leader In
Professional Services Since 1968

PROGRAMMER/ANALYST

Growing financial counseling firm has immediate need for programmer/analyst to support major automation effort.

- Strong financial background
- 1-2 years experience with FORTRAN
- Knowledge of HP-3000 and related utilities (VIEW, IMAGE)
- Experience with systems design in data base environment

Send resume to:

Asset Management Group

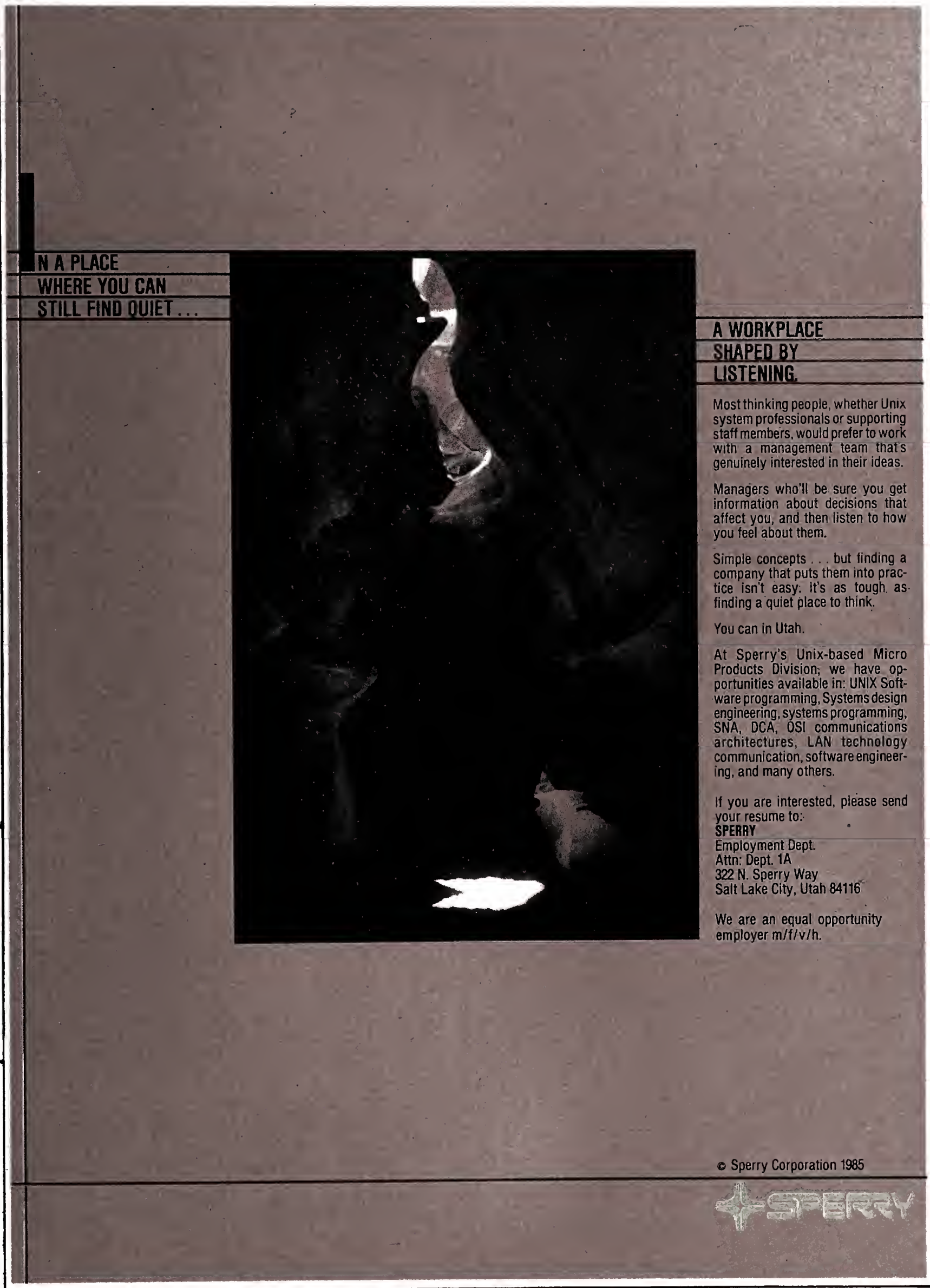
5231 South Quebec Street
Englewood, CO 80111
(303) 694-2190
Attn: Suzanne Lynton

amg™

PROJECT LEADER SCANNING

Brand new department! Direct activities of programers and analysts during development of communication systems between host and remotes. Requires 2-4 years project leadership. IBM and financial or manufacturing systems. Scanning background a plus. Call Mark David or Tim Smith at (612) 339-9001.

ROBERT HALF
OF MINNESOTA, INC.
3636 IDS Center
Minneapolis, MN 55402



COMPUTER POSITIONS

PROGRAMMERS
PROGRAMMER/ANALYSTS
SYSTEMS PROGRAMMERS
EQUIPMENT ANALYSTS

THE NATIONAL FINANCE CENTER
U.S. DEPT. OF AGRICULTURE

Located at Michoud in East New Orleans has permanent positions available which require third generation large scale computer equipment experience in the following areas: DATA BASE support for dual IDMS/CV's running on IBM-370/168 and IBM-4341; computer systems analysis, design, and programming; systems software; ADP security and standards. Salary commensurate with experience. Forty hour work week with flexible hours. Full Civil Service benefits. Applicants must meet qualification requirements as published by the Office of Personnel Management.

Applications from employees with current U.S. Civil Service status are welcome.

Applications may be obtained by contacting:

Ms. Josie Glowacki (TP)
Personnel Office
P.O. Box 60,000
New Orleans, LA 70160
(504) 255-5550

EQUAL OPPORTUNITY EMPLOYER

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist:

Dunhill

OF CHARLOTTE, INC.
6401 Carmal Road, Suita 107
Charlotta, North Carolina 28226
800-438-2012
(NC Call) (704) 542-0312

UNIVERSITY OF KENTUCKY SYSTEMS PROGRAMMER

The University of Kentucky, Institute for Mining and Minerals Research has an opening for a Systems Programmer. Examples of work are: test, check, and analyze program functions to identify faults and design corrections; work with field service engineers to help isolate computer hardware problems; and design and implement new system software including new device drivers and handlers for non-standard devises and specialized applications. Facilities include a VAX 11/780, PDP 11/23 and PDP 11/34. Knowledge of VMS, RSX, FORTRAN, Assembler, and BASIC is a definite plus. Minimum requirements are a BS degree in Computer Science, Electrical Engineering, or a related field and two years experience or the equivalent combination of education and experience. Deadline for receipt of letter of application, including minimum acceptable salary, and resume is May 10, 1985 but may be extended if additional applicants are necessary. Send to: Lou Procter, Lexington Campus Employment Office, East Maxwell Street, University of Kentucky, Lexington, Kentucky 40506-0314.

Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

INDUSTRY UNIQUE IMS 1.3 FAST PATH IMS/ADF VERSION II

DEVELOPMENT OF WORKBENCHES

Middle South Services' Management Information Systems Department is working on projects with tools and methodologies that are Industry Unique. If you are interested in becoming a part of a team of technical professionals that is on a fast track of personal growth and development, we would like to know a little more about you...

We are looking for individuals with a background in one of the following areas:

DATA ADMINISTRATION: ANALYST/PROGRAMMERS

-- Requires 2+ years programming experience with IMS DB/-DC, PL/1, COBOL, ASM and TSO/SPF. Experience with ADF, BTS, and Dialog Manager highly desirable.

-- One position requires 2+ years programming experience with PL/1, COBOL, TSO/SPF and Dialog Manager. Experience with a variety of fourth generation languages and PC's desirable.

ANALYST/PROGRAMMERS

-- The selected individuals will work primarily in the support/-development of end-user applications on the mainframe and must be able to respond to a broad spectrum of user needs. Previous development experience using COBOL or PL-1, JCL, and IBM utilities in an OS/MVS environment required. Knowledge of Structured System Development, SAS, IMS and IBM PC software a plus. Knowledge of IMS DB/DC required for some positions.

NETWORK SYSTEMS ANALYST

-- This position provides analytical and technical support for real-time systems problems, resolves service disruptions, assists in quantifying transaction response time, and develop solutions for computer resource utilization in communications. The selected applicant will have at least five years network operations experience in a large scale environment with thorough knowledge of BASIC, VTAM and NCP software. A Bachelor's degree with an Electrical Engineering major is a plus.

OPERATIONS ANALYST

-- This individual investigates production failures, performs recovery/start-ups, and develops disaster recovery plans. Requirements are six years operations experience in a large mainframe environment with two years in Production Control a plus. Thorough knowledge of TSO, OS/JCL and UCC 7/11 is essential.

Middle South offers an exceptional Relocation Package including:
Relocation Allowance (One Month's Salary)
Paid Moving Expenses
Paid House Hunting Trip
Mortgage Interest Differential plus Interim Living

We offer an excellent benefits Program and Compensation Package. For more information contact Byron Heath or Gary Silbert:

1-800-231-4481
or send resume to:
MIDDLE SOUTH SERVICES, INC.
P.O. Box 61000, NEW ORLEANS, LA 70161

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

COMPUTER SCIENCE

Lyndon State College in beautiful northeastern Vermont seeks computer scientist familiar with ACM program to teach in BS program located in Department of Mathematical Sciences. Full-tima, tenure-track position, rank of instructor-associate professor and salary negotiable, with liberal fringe benefits. Academic year begins September 3, 1985. We are looking for leadership in small but growing ACM program, entering fourth year next Fall, in a small college (900 students). Qualifications: M.S. degrees in Computer Science and Mathematics or Ph.D. in Computer Science; will consider A.B.D. knowledge of VAX 11/750 and UNIX; ability to teach in ACM program and in some mathematics courses. College has VAX 11/750, time-shara on VAX 11/780, 12-terminal lab with graphics, 30 additional workstations. Send lettar of application, resume, transcripts and recommendations, to be received by May 24, to: Perry Viles, Dean of Academic Affairs, Lyndon State College, Lyndonville, VT 05851. EOE.

SOFTWARE ANALYST

A full time and permanent position is available in a large urban medical care facility to conduct system software performance analysis in order to determine system capacity and efficiency. Designs, codes, tests and installs system software including programs, subroutines, macros and the like. Responsible for maintaining an up-to-data knowledge of vendor software releases in order to effectively analyze program problems or malfunctions and to provide technical support to Programmers and others in the requirements, parameters, logic, etc. inherent in such systems. Assists the Hardware Analyst in the evaluation and recommendation of equipment and coordinatas systems software changes to accommodata any changes in the hardware configuration; directs changes in new system software. The work directly involves image processing and UNIX 4.1 with C programming language on VAX/11 series mini computer and De Anza image processor. Requires M.S. or MSE in computer science. $12.98 per hour to start. Send resume to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202, Refer to No. 8785. (Employer paid ad).

MICRO COMPUTER MANAGER

A position responsible for the supervision and leadership of a micro computing and office automation support group that provides comprehensive support services to a large university community. A Master's Degree in Computer Science or related field plus a minimum of 2 years progressiva systems analysis and programming experience or equivalent including experience working with micro computers together with a thorough knowledge of their operating systems, programming languages and major application packages. Position requires excellent verbal and written communication skills and supervisory experience. Experience and education may be substituted for each other on a one to one basis. Submit a letter of interest including salary expectations and applications and/or resume to: Art St. George, Computing Center, University of New Mexico, 2701 Campus Blvd. N.E., Albuquerque, NM 87131. Mention this ad on your application and reference requisition #401-A. Application deadline is May 13, 1985. AA/EOE.

COMPUTER SCIENCE INSTRUCTOR

Horry-Georgetown Technical College is seeking an individual to teach computer technology courses to include RPG, COBOL, and BASIC in the computer science/data processing curriculum. Applicants must possess a Mastars Degree in Computer Science or Bachelors Degree plus 3 years work related experience. Horry-Georgetown Technical College is a two year community/technical college located near Myrtle Beach, South Carolina. The college is accredited by The Southern Association of Colleges and Schools. Salary commensurate with education and experience. Position available August 19, 1985. Submit resume and transcript to Personnel Office, Horry-Georgetown Technical College, P.O. Box 1966, Conway, South Carolina 29526. Closing date for resume May 24, 1985. EOE.

BROWNING-FERRIS INDUSTRIES, INC.

SENIOR DATABASE ANALYST DATABASE ANALYST

Browning-Ferris Industries, Inc., is one of the largest publicly held companies engaged in providing waste collection; processing; recovery and disposal services for industrial and residential customers. Due to rapid expansion within our organization, we are currently developing major on-line interactive computer systems. As a result, the role of our IDMS Database group becomes increasingly important, and a demand has been created for the following:

SENIOR DATABASE ANALYST: 6 years experience in EDP and 3 years experience in Database Administration are required, with IDMS or IMS included in this experience; must be able to develop both logical and physical database designs; code and compile schemas, subschemas and DMCL's; provide technical support to the application group; system installation and internals knowledge is a plus.

DATABASE ANALYST: 4 years experience in EDP and 2 years in Database experience are required. Additional requirements parallel those listed above for the Sr. Database Analyst.

In addition to attractive salaries and benefits, BFI offers a state-of-the-art work environment which includes dual IBM 3083's with MVS/XA, IDMS DB/DC, IDMS/R, ADS/O and all Cullinet products. Relocation assistance is also available. Qualified candidates may send their resumes or call:

BFI
Janet Sumner
BROWNING-FERRIS INDUSTRIES, INC.
P.O. Box 3151
Houston, Texas 77253
(713) 870-7163

An Equal Opportunity Employer

IBM SYSTEM 38 PROGRAMMERS/ PROGRAMMER ANALYSTS

A Fast-Track Career Is Just a Phone Call Away! Call Our Opportunity Hot Line... 1-800-327-5352

Dynamic Control, a division of Travenol Laboratories, Inc., a Fortune 500 NYSE Co., is seeking experienced Programmers and Programmer Analysts to become part of an elite team of software professionals specializing in the implementation, modification and support of healthcare information systems. Opportunities are currently available in Orlando, Florida, Bethesda, Maryland, Chicago, Illinios and our newest branch in Glendale, California.

Work in a state-of-the-art hardware environment; IBM System 38, and make the most of your programming experience in RPG II on IBM S/34, S/36, or RPG III on a System 38 in an interactive on-line environment. We require a minimum of 2-3 years experience.

Dynamic Control offers a nationally competitive salary structure, relocation assistance, a liberal benefits package, in-house technical training and every encouragement to advance professionally. For prompt consideration, call Julia Rae, Personnel, TOLL FREE, 1-800-327-5352. Feel free to call and schedule an "after hours" telephone interview. If you are unable to call, resumes may be submitted to: Personnel Dept. CW/0429, 587 E. Sanlando Springs Drive, Longwood, FL 32750-5187.

TRAVENOL®
Dynamic Control
A Division of Travenol Laboratories, Inc.

An Equal Opportunity Employer M/F

VM/CMS

A world leader in software products and services for large IBM & IBM compatible computers is looking for:

WE WANT VM ENGINEERS
If you have 3-5 years of IBM Assembler programming language experience, understand CP Internals, have a degree in Computer Science (not required, but preferred) and have good verbal and written communication skills, we want to hear from you now!

WE WANT VM PRODUCTS
If you have a VM product that you have developed and would like a world leader to take it to market for you **now**, send us a brief description of that product and we will contact you immediately!

Send resume and/or product descriptions to Box CW-B4634, Computerworld, Box 880, Framingham, MA 01701.

DIRECTOR-OFFICE AUTO To $60K + Bonus

Blue Chip firm headquartered in Twin Cities seeks office systems specialist to act as internal consultant to senior management. Challenging opportunity to work w/employees at all levels and develop company-wide office productivity guidelines and procedures. Also do workshops, executive briefings and seminars. 20% bonus potential! Requires 4 yr. degree and 8-10 yrs. in management or consulting positions with proven strengths in data processing and office automation. Call Mark David or Tim Smith at (612) 339-9001

ROBERT HALF OF MINNESOTA, INC.
3636 IDS Center
Minneapolis, MN 55402

SYSTEMS ANALYST/PROGRAMMER

Pan Am World Services, Inc., Naval Submarine Base Bangor, Bremerton, Washington (a ferry boat ride away from Seattle) is seeking a Systems Analyst/Programmer. Candidates must have at least five years experience in commercial applications development. Hardware and systems software configuration is IBM 4341, DOS/VSE, CICS, DMS, COBOL, RPG and ICCF. Individuals applying must be able to demonstrate thoroughness, perseverance, project lead responsibility and a successful project completion record.

Benefits include health care programs, life insurances, investment plan, holidays, vacation and sick leave.

Send resume and salary requirements to Personnel Dept., Pan Am World Services, Inc., NAVSUBASE - Bangor, Bremerton, WA 98315.

EQUAL OPPORTUNITY EMPLOYER M/F/H

SENIOR PROGRAMMER ANALYST

Community Hospitals of Central California, San Joaquin Vally's largest health care provider has an immediate opening for a Senior Programmer Analyst. This challenging opportunity includes design, development and implementation of On-Line financial and clinical software assistance. This position requires minimum of 3 years On-Line financial systems experience and knowledge of VMS and/or MUMPS. A degree in Computer Science preferred. CHCC offers a competitive benefits package. For immediate consideration, submit your resume with salary history to:

Susan Johnson
Personnel Department
Community Hospital of Central California
P.O. Box 1232
Fresno, CA 93715
(209) 442-3944
Equal Opportunity Employer

PROGRAMMER ANALYST

Packaging Corporation of America has an immediate opening for a qualified degreed candidate with a minimum of 2 years COBOL programming experience on Honeywell level 6. Manufacturing background a plus. Our location provides easy access to Akron and Cleveland. Send resume and salary requirements to:

James R. Truho
Director Industrial Relations
Packaging Corporation of America
Rittman, Ohio 44270
EOE M/F/H/V

EDP PLAN

The only sure way to achieve career growth is by planning and scheduling. The fact is that you have neither the *specialized know-how* nor the *inside information* that is required to guarantee success. We can help you. Our NCA firms specialize in EDP Career Development. Our professional consultants have the experienced expertise to help you plan and time your objectives...but more importantly, they have the contacts that can help you attain them.

Get your EDP Career Plan started today. Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. No charge to you ever for our specialized services.

ATLANTA: 8AI Limited
3475 Lenox Road N.E., Suite 490-C
Live Oak Center
Atlanta, Georgia 30326 (404) 231-4545
BOSTON: Robert Kleven and Co., Inc.
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020
CHICAGO: Thos. Hirtz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1555
COLUMBUS: Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8600
DENVER: Abacus Consultants, Inc.
1777 South Harrison, Suite 404
Denver, Colorado 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel, Inc
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580
FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33024 (305) 434-6112
HARTFORD: Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc
1980 Post Oak Boulevard, Suite 1050
Houston, Texas 77056 (713) 626-4100
INDIANAPOLIS: Career Consultants
107 N. Pennsylvania, Suite 404
Indianapolis, Indiana 46204 (317) 639-5601
KANSAS CITY: O. P. Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-8288
LOS ANGELES: Superior Resources, Inc
Personnel Service
6016 Fallbrook Avenue, Suite 200
Woodland Hills, California 91367 (818) 884-3000
MILWAUKEE: EOP Consultants, Inc
Chancellory Park II
350 N. Sunnyslope Rd., Suite 350
Brookfield, Wisconsin 53005 (414) 797-8855
MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-6714
NEW YORK: Botal Associates, Inc
7 Oey Street, Suite 410
New York, New York 10007 (212) 227-7370
NEW YORK UPSTATE:
CFA Associates Personnel, Inc
2530 James Street
Syracuse, New York 13206 (315) 463-5225
NORTH CAROLINA: DataMasters,
Div. of TaskForce, Inc., P.O. Box 6888
Greensboro, North Carolina 27405
(919) 373-1461
PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 Scottsdale Road, Suite 209
Scottsdale, Arizona 85251 (602) 274-6666
PITTSBURGH: Mortell, Liguore & O'Brien, Inc.
P.O. Box 836
Allison Park, Pennsylvania 15101 (412) 487-5153
SAN FRANCISCO: The Computer Resources Group,
Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700

National Computer Associates

Call the NCA firm nearest to you for Salary Survey and Relocation Information

STEP OUT OF THE RANKS

And Apply Your Computer Skills In Our Technical Development Division

Electronic Data Systems (EDS) Corporation can help you attain your career goals within our Technical Development Division. We seek talented information processing professionals who want to apply their computer skills in the instruction of recent college graduates through our Systems Engineering Development (SED) Program.

The SED Program, nationally recognized as the model for the industry, is designed to turn out the best Systems Engineers. At EDS, a Systems Engineer is a computer programmer, programmer analyst, and systems analyst all in one — capable of solving complex business problems through computer applications.

The professionals we seek must have 3-5 years work experience and have a keen interest in both the technical and business aspects of information processing. Candidates must also have excellent comprehension of COBOL or ALC and recent IBM mainframe experience. Background in CICS, VSAM or in a data base environment is a plus. Although no previous teaching experience is required, you must have a professional image and be able to present your thoughts clearly in an organized manner. U.S. citizenship is required.

These positions are highly visible and offer an excellent introduction into management. Our instructors are afforded the opportunity to supervise 20 employees, make performance evaluations, and provide career counseling. At the end of a typical 18-month to two-year assignment, instructors are given the opportunity to remain in the education department, or to choose another career path within EDS according to their interests and capabilities. If you are interested in learning more about the opportunities available to our SED Instructors, please call or send your resume to:

Richard Burges
Electronic Data Systems Corporation
Corporate Headquarters Recruiting
12200 Park Central Drive
Suite 200, Dept. 1CW1195
Dallas, TX 75251
(214) 392-8617

EDS

Electronic Data Systems Corporation

Equal Opportunity Employer

SysTec Inc.

SysTec is a nationwide service company with headquarters in Florida.

There are now excellent opportunities for Senior F.E.'s and hardware technical specialists in IBM, **AMDAHL** mainframes and IBM and all plug compatible peripherals including STC, Memorex, Telex, etc.

SysTec provides a unique growth environment for capable and ambitious individuals.

In addition to excellent salaries, benefits include 100% medical and dental for employees and dependents, life insurance, disability, ESOP, and 401K plans.

Opportunities in the following cities immediately:

- **Greater Washington, D.C. area**
- **St. Louis, Missouri**
- **Columbus, Ohio**
- **Detroit, Michigan**
- **Richmond, Virginia**
- **Positions in other cities available soon**

Send resumes to:

Mr. Ben Randolph, V.P.
SysTec, Inc.
6694 Fleet Drive
Alexandria, VA 22310
OR
Call (800) 327-2202

ASSISTANT ASSOCIATE PROFESSOR COMPUTER SCIENCE

Individual will teach courses in the various computer languages (FORTRAN, BASIC, PASCAL, "C", ADA) and several of the following areas: data structure, operating systems, system internals, real-time programming, AI and Expert systems. VAX experience is desirable. Ph.D in Computer Science preferred, MS in Computer Science and industry/teaching experience considered. Salary is commensurable with experience and background. Rank depending upon qualifications. Tenure track position. Appointment begins September 1985. This position will not be filled prior to May 20. Send letter of application, resume, and three reference letters to:

Mr. Charles Crittenden
c/o Personnel Department - 1016
Weber State College
Ogden, Utah 84408

WSC is an equal opportunity/ affirmative action employer m/f

Lachman Associates Inc.

JOIN A COMPANY ON THE MOVE!

LAI is a growing systems software development and consulting firm that can use your talents in the UNIX, C, UTS, NMS, and Networking! Opportunities in New Jersey, Columbus, Chicago, Denver, and world wide. Benefits include paid vacation, health insurance, profit sharing, and others. For further information, please contact:

Lachman Associates, Inc.
Staffing-CP
645 Blackhawk Drive
Westmont, IL 60559
1-800-L•A•I-U•N•I•X
(312) 986-8840

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DRC:

30 YEARS STRONG.

At DRC, we are providing the Department of Defense with expert assistance in the development and acquisition of C^3I systems. Our involvement is total, and we have a wide range of opportunities for degreed professionals to lead or participate in data base development, systems and software engineering, logistics and acquisition support tasks.

Immediate positions are available in the following areas:

- **Distributed Data Systems**
- **Data Communications**
- **Laser Communications**
- **Satellite Communications**
- **Computer Architecture**
- **Computer Information Systems/ Operating Systems**
  COBOL, FORTRAN and PASCAL, HONEYWELL GCOS-8 and VAX VMS

We offer competitive salaries and benefits and a dynamic, people oriented environment with challenging career opportunities. If you are interested, send your resume or letter of introduction to Dynamics Research Corporation, Dept. CW, 60 Concord Street, Wilmington, MA 01887.

U.S. Citizenship required
An equal opportunity employer.

DRC® DYNAMICS RESEARCH CORPORATION
WILMINGTON, MASSACHUSETTS

CUSTOMER SUPPORT REPRESENTATIVE

Leading software house has an immed opening for a technical CS rep familiar with WANG VS COBOL. Person must have 2 yrs technical/pgming exper and good communications skills. Familiarity with MCBA pkgs a plus. This varied and challenging job includes S/W maintenance as well as customer problem solving.

Rush Resume To:

MCBA
2441 Honolulu Avenue
Montrose, CA 91020
Attn: Personnel Manager
(818) 957-2900

SOFTWARE ENGINEER

Applying knowledge of micro processor based control systems and utilizing advanced data base organization and comparative computer architecture; design, develop, extend and/or modify software systems for telecommunication products (using PASCAL and INTEL 8080). Requires a Master's Degree in Computer Science. Willing to accept someone without experience if candidate's graduate work included research in an implementation of a micro processor based control system and at least one course in advanced data base organization and one course in comparative computer architecture. Salary offered $30,000 per year, 40 hour base week, 9:00 a.m. to 5:00 p.m. M-F. Send resume to: Mr. Herbert B. Krakau, Vice President, Engineering, Dytel Corporation, 721 West Algonquin Rd., Arlington Heights, IL 60005.

COMPUTER SERVICES ACADEMIC COORDINATOR

Duties include: consultant to faculty for research and CAI, training programs, supervising tutors, and coordinating projects with other IU campuses. Requires bachelor's degree in C/S or related field and 2 years programming. Salary low to mid 20's. Send resumes by 5/15/85 to:

W. Bennett
Indiana University at Kokomo
2300 S. Washington St.
Kokomo, Indiana 46902

Indiana University is an Affirmative Action/Equal Opportunity Employer

---

New England, Westchester & NY Metropolitan Area

Salaried or Independent

INT'L BANKING ● FUNDS TRANSFER ON-LINE BROKERAGE ● CHECK PROC.

SYCOR-COBOL, Honeywell DPS8, DM4TP, GMAP, IDMS, CICS, IMS (DB/DC), VAX-BASIC, BURROUGHS-DMS, ALGOL, HONEYWELL COBOL Level 6, TPS-screen write, Level 8, DMIV, TP, or MULTICS.

Openings at all levels in any of the above. Call Maggie Liptak, 212-307-0939 or submit resume to Interface Inc., 17 West 54 St, NY, NY 10019.

SR. EDP AUDITOR

$50,000

3+ yrs in on-line environment, preferably 43XX essential for this prestigious media concern. 40% travel involved to Eastern States & Europe. Exclnt oral & written skills a must. Rapid advancement. FEE PAID

ROBERT HALF OF NEW YORK, INC.
522 Fifth Avenue
New York, N.Y. 10036
212-221-6500 (agency)

VM/CMS

Systems Programmer/Systems Manager. Established operating procedures, write/integrate VM and utility programs for IBM 4381. Create, modify, debug and document systems and applications programs. Supervisory responsibility. Familiarity with IBM 370 architecture, VM/CMS and CP internals manditory. Reports to manager, LOTS computer facility. Submit resume to:

STANFORD UNIVERSITY
Personnel-Ref.#47257
Attn. Kathy Demoulin
Stanford, CA 94305
415/497-0918

MIS MANAGER

Expanding international non-profit seeks manager with excellent interpersonal skills capable of completing systems development. 2-3 years experience with UNIX, C and relational DBMS preferred. Salary to mid $30s. Send resume to:

J. Kuenzig
Box 127
Belmont, MA 02178

Office Systems Analyst

Sundstrand is seeking an individual with a B.S. degree in Business Administration or Computer Science and 3 years' analysis experience in finance, marketing or office systems. Familiarity with IBM microcomputers and peripherals, word processing software, OCR and dictation equipment is preferred.

Duties will include analysis of end user needs and recommendation of equipment consistent with current policies and standards. Superior verbal and written communication skills are essential.

As a Fortune 500 company, Sundstrand offers a competitive salary and excellent benefit package. Our location in Rockford, Illinois offers the amenities you'd expect in a major city -- education, culture, sport and entertainment -- in a small-town atmosphere ideal for family living.

To be considered for this position, please send your resume and salary history to: Brian Hayes, Sundstrand, 4747 Harrison Ave., P.O. Box 7002, Rockford, IL 61125-7002.

An Equal Opportunity Employer

SUNDSTRAND

ACP/PARS PROGRAMMERS

Requires software development experience using airline control language for transaction processing systems.

BAL PROGRAMMERS

1 year IBM Assembler experience required or no experience but have a BS degree in Computer Sciences and be capable of passing an IBM Assembler skills test. These positions offer the opportunity to learn sophisticated software development using transaction processing technology (ACP, PARS, TPF).

IBM CICS APPLICATIONS PROGRAMMERS

Minimum 2 years COBOL programming experience with working knowledge of Command Level CICS or DL1.

PL1 PROGRAMMERS

Minimum 2 years PL1 experience in an OS/MVS environment with JCL.

Exciting changes are taking place at Eastern. We have recently implemented a new programmer salary structure which offers higher salaries and rapid career growth opportunities to individuals with exceptional performance. Our first quarter's financial results may return well over $1,000 in profit sharing to each employee. We offer worldwide travel discounts including the Caribbean, South America and our new London service. We also offer excellent company paid family health benefits.

If you are interested in becoming a member of the Eastern family based in sunny Miami, Florida, send detailed resume, including salary history, to: Eastern Airlines, Management Recruiting, Department VO, International Airport, Miami, FL 33148.

EASTERN

Equal Opportunity Employer M/F

---

case®

SYSTEMS PROGRAMMERS

We are a major multi-national manufacturer located in Racine, Wisconsin, with a worldwide computing network. Due to a recent acquisition, we are in need of Systems Programmers in the areas of MVS, IMS, Teleprocessing, and Performance Management. If you have experience in any of these areas and a desire to work in a state-of-the-art environment, we would like to talk with you.

Our Current Configuration Includes:

- 64 MEG 3084Q and 32 MEG 3081K
- Over 1200 IMS Terminals (over 2000 by end of 1985)
- Worldwide VTAM MSNF Network with 7 other CPU's
- MVS/XA and JES2
- IMS 1.2 (Testing IMS 1.3)

Responsibilities:

- Problem resolution
- Install and maintain system software
- Write exists and utilities
- Evaluate new software
- Assist in hardware configuration
- Network design

We offer an excellent salary and benefits package. To explore this opportunity, please forward a resume or a letter of application outlining your qualifications (with salary requirements) to:

J I CASE COMPANY
A TENNECO COMPANY
Employee Relations Dept./Case West
700 State Street, Racine, WI 53404
(All information will be kept in strictest confidence)
Equal Opportunity Employer M/F/H/V

TENNECO

INTERACTIVE IMAGES

Software Applications Consultants

You will participate in pre- and post-sales support, as well as customer training. Using EASEL, our proprietary development software, you will consult with customers in the design and implementation of PC-based color graphics interfaces to remote host appplications.

You must have at least 2-3 years of professional programming experience and a proven track record in working with customers/users in the design and development of interactive systems. Excellent communications skills are essential. Familiarity with IBM PC, mainframe business applications, communications, DSS, graphics, and "C" a plus.

Our products run on the IBM PC under DOS and are used to build end-user interfaces to remote mainframe applications. We emphasize 'pointing' input, using a touch screen, mouse, and color graphics. Our software is being used by Fortune 500 companies workdwide.

Interactive images offers an excellent benefits package and flexible hours, with equity available for qualified individuals.

Please send resume, specifying the position for which you are applying to:

Judy Doelling
Interactice Images, Inc.
600 West Cummings Park
Suite 4500
Woburn, MA 01801

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

We're looking for a frustrated IDMS Data Base Administrator!

We're looking for the person who recognizes the power of IDMS as a software tool but is in an organization slow to utilize that power.

We are *fully* committed to IDMS. We have the latest in software — in fact, we were a Beta test site for IDMS Release 10.0.

Major new developments are underway and we need *your* IDMS expertise to support project teams in data base design.

Not only do we have full commitment to IDMS, we are also fully committed to training. Most importantly, our team environment affords the opportunity to *apply* your knowledge.

So, if you are ready for a positive change, let us know.

Please send your resume and salary requirements to the Employee Relations Department. Principals only.

Central and South West Corporation
P.O. Box 220164 • Dallas, Texas 75222

Central and South West Corporation is one of the nation's leading electric utility systems, having annual revenues of more than $2 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

Equal Opportunity Employer

GLIMPSING THE FUTURE



At Northrop Aircraft Division, you will see future advancements being made in many technological disciplines. In computing, there is a wide range of systems and software, some of which are the most sophisticated of their kind. Your efforts will contribute to our worldwide reputation as a high technology leader. A standing built on our over 40 year history developing and producing many of America's most advanced aircraft and airborne systems. Join us at our extensive research, laboratory and production facilities in Southern California. It's all within your reach through one of these outstanding positions:

QA N/C Programmer Analysts

Investigate and plan method of inspection and N/C programs to direct computer controlled inspection machines. Operate CMM machines to create "as you inspect" N/C programs and prove automated programs. Requires 2+ years' experience programming computer-controlled, coordinated measurement machines.

Please send resume to: Gloria Daniels

System Support Specialists

You should have 4+ years' experience in the following technical areas on an IBM 43XX or 30XX mainframe: PL/1, TSO, RACF, MVS, CICS, VSAM, FORTRAN, JCL, CLIST. Experience in project management, systems analysis and conducting employee training classes in one or more of the above mentioned subjects. BS in Computer Science or related subject required.

Please send resume to: Roger Valdez

N/C Engineers/ Programmers

Will solve complex N/C programming problems utilizing APT and computer graphics and develop new N/C programming systems and procedures. Complex 5-axis aircraft type part programming experience and 5+ years' experience required.

Master Dimensions Engineers

Will prepare master dimensions computer programs for engineering design, N/C drafting machines and N/C equipment through analysis of preliminary design data and basic dimensions. Experience in FORTRAN related to configuration design and lofting applications and 3+ years' experience required.

Please send resume to: Judy Rudman

We invite you to learn more about our unique career opportunities, benefit plans and relocation assistance by sending your resume to the appropriate person listed above to: **Northrop Aircraft Division, Employment Office, 12540 Crenshaw Blvd., Hawthorne, CA 90250.**

PROOF OF U.S. CITIZENSHIP REQUIRED. Northrop is an Equal Opportunity Employer M/F/H/V.

We're within your reach.

NORTHROP
Aircraft Division
Aircraft Group

Information Systems Developers

Corporate planning at AT&T is exhilarating work.

As a Designer, Planner, or Consultant in our Corporate Manufacturing Resource Planning (MRP-II) Systems Development and Implementation Organization, you will specify systems, establish new manufacturing planning and control capabilities, and have a key role in the design of state-of-the-art Master Production Schedule (MPS) and Production Activity Control (PAC) Systems.

Guiding the creation and implementation of MRP-II Systems for a national network of manufacturing facilities takes a whole lot of orchestrating. It's no job for beginners.

That's why we expect you to have at least a BSCS (and preferably an MBA degree), and solid experience in planning, development and implementation of IMS Data Base Systems for MRP-II applications. Specifically, in the areas of Manufacturing Order Control, Master Production Scheduling, Capacity Requirements Planning, and Production Activity Control. APICS Certification is a definite asset.

In addition, there are opportunities for Information Systems Developers with Distribution Resource Planning experience.

You will be based in Northern New Jersey, and have brief trips to manufacturing facilities throughout the U.S. Salary will be entirely appropriate to credentials. Recognition factors are excellent.

For careful, confidential consideration, please send your resume with salary history to: Ms. Eileen Kelly, Dept. CW, AT&T Technologies, Gateway Two, 17th Floor, Newark, N.J. 07102.

When you've got to be right.

AT&T

An equal opportunity employer

Project Managers/ Banking Industry

Exc. oppty to move into key mgmt positions with aggressive financial institution. Five newly created positions calling for expertise in EFTS, ATM, DDA, commercial loan, trust, etc. Rapid advancement in fast-track operation. Salaries to high $40s+. Liberal relocation pkg & super benefits. Immed interviews. Client co pays all employment costs. Call C. Hankins at **(704) 375-0600** or send resume to

212 S. Tryon Street, Suite 1350
Charlotte, NC 28281

FOX-MORRIS

DATA LINK

COME TO NEW ENGLAND

and see what we have to offer!

New England has skiing, sailing, mountains, beaches, a Courier and Ives atmosphere, and a professional climate that is very exciting; i.e., P/A's, S/P's, SW Eng's with experience in PDP, INTEL, HONEYWELL, IBM, WANG. A UNIX, C and graphics background is also desirable.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5400

S/38 TO Mid $30's

Twin Cities opportunity. Are you a Programmer/Analyst, skilled in RPG III Systems development, and ready for the step to management? This position is for the "shirtsleeve" professional who can do programming, supervise others, and build a department. Most manufacturing, financial, and sales systems up and running. Requires 2-8 yrs' DP experience, and 2 years + RPG III. Call Mark David or Tim Smith at (612) 339-9001.

ROBERT HALF
OF MINNESOTA, INC.
3636 IDS Center
Minneapolis, MN 55402

COMPUTER PROGRAMMING INSTRUCTOR/ASSISTANT PROFESSOR
Clermont General and Technical College (University of Cincinnati)

To teach and assume laboratory responsibilities in the following programming languages: COBOL, BASIC, PASCAL using structured programming concepts. May also teach Systems Analysis & Design and Data Base Management Systems (DBMS). Knowledge in the following will be a plus: Tominy's DATABASE-PLUS, PL/I, FORTRAN, RPG II, and micro-computer applications. Minimal qualifications are BS degree and experience working in the DP industry. Send vitae, transcripts or credentials, and reference list by May 31, 1985 to: Dr. George Wolff, Acting Dean, Clermont General and Technical College, Batavia, Ohio 45103. U.C. is an Equal Opportunity Employer.

YOU DON'T KNOW WHAT YOU'LL BE DOING IN FIVE YEARS. AND YOU THINK THAT'S EXCITING.



Discovery.

As recruiting specialists to the data processing world, we appreciate your enthusiasm for the unknown. You are a pioneer, a discoverer. Our job is to help you find a position with a company that shares your commitment to growth. Where there are opportunities to explore and learn.

To do that takes an understanding of your field almost as great as your own. That's why CompuSearch is staffed by data processing specialists. We have the know-how to bring you together with people who speak your language.

CompuSearch is on the leading edge of data processing recruitment. And, like you, we're excited about the future. Because, one of the reasons we're successful in our work is . . . we're discoverers, too.

CompuSearch®
A Division of Management Recruiters International
Check your white pages and call today.

WANTED: SPERRY UNIVAC PROFESSIONALS

NIKE, America's largest athletic shoe and apparel firm, has an immediate need for seasoned UNIVAC talent due to continued sales growth and increased utilization of our Information Services Group. Our facility, one of the Pacific Northwest's largest computer operations (based in the Portland Metro area), continues to expand in a rapidly changing environment.

Senior MAPPER System Coordinator/Analyst - In this new position you will need both proven technical skills and effective user-interface abilities to help spearhead user involvement with our information systems. Specifically, you will serve as the primary back-up resource to our MAPPER Coordinator, consult on application development projects, advise MIS, Management and Users on the use of MAPPER and its alternatives, and provide training and support for the effective use of information systems. Ideal candidates will have a B.S. in Computer Science or Business, 3-5 years Sperry applications development experience and 1-2 years MAPPER development experience.

Programmer/Analysts - You will be developing applications for our financial functions. We are looking for people with 3-5 years P/A experience (utilizing COBOL in a Univac 1100 environment) who can apply sound programming skills and analytical abilities in a project team organization.

System Programmer - This position, also a new opening, will be responsible for maintaining systems software on a Univac 1100/74 machine, and providing technical assistance to our applications programming and operations staff. We are in need of a person with 2-3 years current experience as a systems programmer on a Sperry 1100. You also should have working knowledge of one or more of the following: OS1100, TIP, DMS, DPS, CMS/TELCON.

Database Specialists - These positions will be providing technical assistance and leadership regarding our DMS 1100 database and related software. You will also be responsible for all database support functions (recovery, backup, reorganization, performance). These positions require 5+ years programming experience and 2 years database work, preferably on DMS 1100.

If you can offer us sound technical abilities coupled with excellent communication and interpersonal skills, we can offer you:

- **the opportunity to work with state-of-the-art hardware/software**
- **a professional environment in a high-charged, dynamic company**
- **a clean, thriving metropolitan area with close access to the coast and mountains**
- **an excellent benefit program including medical, dental, optical, and Profit-sharing**

If you would like to be in the running for these opportunities, please send a resume/salary history to:

NIKE.

Personnel Dept. C
NIKE, Inc.
3900 SW Murray
Beaverton, OR 97005
Attn: Al Lave

WE NEED YOU.

WE'RE HIRING
Senior IBM Systems Programming and Management Personnel

We need professionals to work in our MICS, product line who are knowledgeable in state-of-the-art IBM technology with experience and expertise in:

- MVS/XA or TSO
- VTAM or SNA
- IMS, CICS, or DBII
- SMP, INFO/SYS and INFO/MGMT
- ISPF/DM

We need *you*, if you also have a solid background in MVS installation management in any of these areas:

- Senior Technical Management
- Capacity Planning
- Performance Measurement
- Systems Modeling
- Network Management
- Customer Service
- SMF, RMF and Reliability Data Analysis
- IMS or DB2 Analysis
- Product Education and Documentation
- Problem/Change Management

Our atmosphere is casual, but intensely productive. Our salary, benefits, and relocation package is one of the best in the industry. Our commitment is to excellence — in software products, user support, education and staff.

If you are interested in a fast-paced, technically challenging, business driven firm, that is among the top 50 U.S. supplier's of software products and services as ranked by the ICP Software Business Review, call or send credentials to:

Marianne Brown
MORINO ASSOCIATES, INC.
8615 Westwood Center Dr.
Vienna, VA 22180-2215
(703) 448-8868

An Equal Opportunity Employer

IBM PROGRAMMERS

Multiple openings for Programmers to work on a contract basis. Positions require 3-5 years of programming experience using IBM mainframes, PL-1, and IMS/DC.

Major conversion project of 6-12 months duration. West Texas location. Hourly rates of $25.00.

Call or send resume to:

Computerware, Inc.
12901 Nicholson Rd.
Suite 200
Dallas, TX 75234
(214) 620-2091

DIRECTOR OF COMPUTER SERVICES

Position available July 1, 1985 for director of computer services in Eugene School District, Eugene, OR. An opportunity to develop a district wide computer system in a forward looking district of 17,000 students with an annual budget in excess of $70 million. An expanding computer department will utilize a new VAX 11/780 System. An energetic, talented individual possessing both computer knowledge and management, human relation skills is desired. Salary range $40,000-$48,000 a year with outstanding fringe benefit package. For additional information contact: Carolyn Hult, Director of Personnel, The Eugene School District 4J, 200 North Monroe Street, Eugene, OR 97402, (503) 687-3247. Interested applicants forward letter of interest plus complete resume of personal history, education, work experience and references by May 6, 1985. Equal Oppportunity Employer.

PROGRAMMER ANALYST, ADVANCED

To direct and coordinate utilization of all data processing resources, including 23 IBM PC's, 10 IBM PC AT's, 33 Terminals, and 38 Printers. STATE SERVICE PROVIDES EXCELLENT FRINGE BENEFITS. SALARY RANGE: $22,584 - $30,408 annually - beginning salary depends on qualifications + 7% increase July 1, 1985. REQUIREMENTS: 3 years experience in computer programming and systems analysis, one year of which was in senior level involving complex programming techniques. CONTACT: Personnel Office, Central State Hospital, Milledgeville, Georgia 31062-9989. PHONE: (912) 453-4094. The deadline for applying is May 10, 1985.

EQUAL OPPORTUNITY EMPLOYER

DEC VAX & PDP
ALL FEE PAID
NC, SC, VA, TN

If you have **DEC** experience, and are seeking progressive, innovative firms to further your career path; call **TODAY!** I am representing 8 clients with opportunities ranging from programmer analyst to systems programmer with salaries of $25-$45K. Call the DEC Specialist:

SHERRY LEA
PERSONNEL PLACEMENT, INC.
P.O. BOX 1815
BURLINGTON, NC 27216-1815
(919) 584-5591

Computer

IMMEDIATE OPPORTUNITIES FOR

COMPUTER SYSTEMS ANALYSTS

TRACOR is forming a team to design, develop and install a fully automated radio telephone service. You will work at our Rockville facility using DEC VAX 11/785 and MICROVAX systems. We are seeking team members at both Junior and Senior levels with the following qualificiations:

- BSCS/BSEE/BS math required:
- Minimum 2 years experience in design/coding of systems in a VAX/VMS environment using Pascal.
- Experience with DECnet or real time is a plus.

To arrange for an immediate interview, please call Jerry Horna at 301-279-4444 or 800-638-8512. If a call is not convenient at this time, please send your resume to: TRACOR, INC., Dept. E-220, 1601 Research Boulevard, Rockville, MD 20850. We are an Equal Opportunity Employer.

Tracor Applied Sciences
Where your contribution counts.

Don't trust us to keep your classified information secret

Every week, we deliver more of your target audience than anyone else. Over 600,000 computer-involved professionals. Including MIS/DP directors, systems analysts, programmers, and engineers – as well as corporate presidents, treasurers, and general managers.

And we deliver these readers for less. Compare costs and the people reached. You'll see that Computerworld is the number one medium for reaching MIS/DP professionals.

We make your ads work harder. Because we divide the classified section into logical categories: Position Announcements; Buy, Sell, Swap; Software For Sale; Time & Services; and The Bulletin Board. (Available on request: Software Wanted; Business Opportunities; and Real Estate).

We'll even typeset your ad at no extra charge. All you need to do is attach clean typewritten copy to your order. (Figure about 25 words per column inch, not including headlines). Or give us your order over the phone. We'll do the rest.

And since we're published weekly, we can offer you a fast turn-around from when you place your order to when your ad appears. As little as 10 days.

The next time you want results, advertise in Computerworld classified pages. Call toll-free at (800) 343-6474. In Massachusetts, call (617) 879-0700. Call now. **COMPUTERWORLD**, Box 880, 375 Cochituate Road, Framingham, MA 01701

APR



The Key For Data Processing Professionals Seeking Growth

Advanced Programming Resources, Inc., a dynamic growth-oriented contract services organization, is searching for individuals with several years working experience in telephony and advanced communications technologies to fill these positions:

Software Developers/ Designers/Analysts

- C, PASCAL, and UNIX System experience
- Real time software systems architecture, design, development, programming and maintenance
- Data communications experience involving asynchronous and synchronous protocols such as X.25
- Micro-processor-based software development and debugging, network protocols and intelligent peripherals
- Operation support system development
- Familiarity with layered software architectures, database reliablity issues, human machine interfaces and designing for distributed processing

Hardware Developers/ Designers/Analysts

- Telecommunications systems planning, digital signal processing, switching system requirements, call processing, power systems, tool development and writing device drivers
- Structured programming and configuration control
- Firmware development for I/O and telephony
- Line and/or commin channel signalling

These positions require individuals with a BS in Computer Science with 5-7 years experience and/or a Master's degree in Computer Science with electrical engineering background and 3-5 years experience.

APR provides an excellent salary (commensurate with years of experience and education), along with fully-paid compony benefits. If you feel you want to join the leader, please call and/or send your resume, in confidence, to: **Corporate Recruiter, ADVANCED PROGRAMMING RESOURCES, INC., 6800 N. High Street, Worthington, Ohio 43085.** An equal opportunity employer, m/f.

APR

ADVANCED PROGRAMMING RESOURCES, INC.

Programming

CITICORP TTI

Citicorp/TTI, an innovator of advanced systems for Citicorp, is leading the research and design of the electronic systems of tomorrow. We are currently seeking qualified candidates for the following positions:

Project Manager, Applications Division

Act as Project Leader in the installation of financial systems on an IBM mainframe. At least five years' experience in Applications/Systems with some experience in an IBM environment required. BA degree preferred, coupled with excellent interpersonal and communication skills. Current involvement with project management is also required.

Screen Development

We seek an individual who will provide leadership in the design and development of an automated application generation system. Background should include an appropriate college degree and recent experience in graphics, CAD/CAM systems, and man machine interfaces. Familiarity with UNIX* and "C" language is highly desirable.

Artificial Intelligence

Assume a leadership position in the field of Distributed Expert Systems. Provide technical expertise and awareness in knowledge engineering methodologies to determine their potential utilization within Citicorp. We require an advanced degree in Computer Science or equivalent, with specific experience in Distributed Processing, Lisp and the UNIX* kernel. Knowledge of state-of-the-art Natural language processing highly desirable.

IDMS Technical Support Specialist

Responsibilities include providing an IDMS knowledge base of both external functionality and internals, tune sysgen parameters for IDMS/DC and IDMS/CV, monitor IDMS/DC and IDMS/CV, and recommend changes to improve performance. Qualifications include a BS/MS in Computer Science or a related area and five plus years of IDMS-CV/DC, DBA and/or DCA experience.

Systems Architects and Prototype Developers

Seeking skilled professionals for advanced development project aimed at emerging technologies and targeted at business and consumer information management needs. These emerging technologies include: artificial intelligence, natural language, image, document, text, voice, videotex and decision support systems. The technical environment includes personal computers, distributed central servers and strong use of rapid prototyping to demonstrate feasibility and value.

The positions require a minimum of a BS in Computer Science or related area and five plus years of varied systems and development experience, including: large scale central server, large scale DBMS and data base design, prototyping of complex systems, personal computer and UNIX* developments, and experience and skill with emerging technologies.

Systems Design Engineers

Develop and implement system prototypes using new technology components, subsystems and systems. Responsibilities include hands-on involvement in the integration of image peripherals into the current development system; development of a hardware architecture design to support high speed processing of image type algorithms; and design of a document image capture system.

MS degree preferred with 5-10 years' experience in hardware/software design of systems using CRT displays, communications, computers and peripherals. Experience with high-level structured languages such as "C" in a UNIX* environment highly desirable.

We reward our employees with an excellent salary and a comprehensive benefits program. For immediate consideration, please send your resume to:

CITICORP TTI

Department 277DG
3100 Ocean Park Blvd.
Santa Monica, CA 90405

A Subsidiary of CITICORP

Equal Opportunity Employer M/F/H
*UNIX is a trademark of AT&T Bell Labs

MARTIN MARIETTA DATA SYSTEMS

Located at the foot of the majestic Rocky Mountains, Martin Marietta Data Systems provides excellent opportunities for career growth while enjoying the life-style associated with Denver and the Rockies.

IMS APPLICATION PROGRAMMERS

Join our professional staff in designing, developing and maintaining IMS/COBOL applications on IBM mainframe systems.

Requirements include:

- BS Degree or equivalent
- 2 - 10 years IMS/COBOL experience
- Financial or manufacturing applications experience preferred

WE ALSO HAVE ADDITIONAL OPENINGS FOR DATA PROCESSING PROFESSIONALS IN A VARIETY OF AREAS.

Martin Marietta Data Systems offers an excellent compensation and benefits package (health, dental, vision care), including relocation benefits. For immediate consideration, forward your resume and salary history to: Personnel, MARTIN MARIETTA DATA SYSTEMS, 98 Inverness Drive East, Suite 135 (P180), Englewood, CO 80112.

Equal Opportunity Employer M/F/H/V

MILE HIGH OPPORTUNITIES IN DENVER, COLORADO

SOUTH & NORTH CAROLINA LOCATIONS

SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS

We currently have many fee paid openings for IBM experience using Cobol, CICS, IDMS, IMS. Assembler and insurance experience a plus on some positions. $25-$45K.

Please send resume to:

Chris Scott
System Search, Inc.
P.O. Box 17881
Greenville, SC 29606
(803) 235-1197

WASHINGTON, D.C.

CONVERSIONS

Know S/34, S/36 or S/38? YES! GOOD! Call us for an opportunity to grow with this dynamic firm! MAPICS is a plus; degree is a plus. You can manage three. Go! $35k.

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave Ste 401
Washington, D.C. 20814
(301) 652-1960

SYSTEMS ANALYSTS/ PROGRAMMERS



Sail into a computer consulting career in Baltimore...

With Comp-u-Staff, a dynamic, young professional consulting company providing data processing services to Fortune 1000 companies.

Here, the people are the company. With a heavy emphasis on staff training and development, you'll find yourself in the midst of an expert staff of data processing professionals dedicated to excellence in all phases of application development.

You can program your career for success if you possess at least 2 years of programming or analysis experience in one or more of the following: IMS DB/DC, CICS/DLI, TANDEM or HP 3000.

We offer above average compensation and a comprehensive benefits package, coupled with Baltimore's locational advantages. Few cities can boast the range and depth of its cultural and recreational attractions. The best of the performing arts of theatre, music and ballet and the treasures in our museums await you -- plus the thrill of sailing on the Chesapeake Bay!

For prompt consideration, direct your resume in confidence to: Keith Cuomo, COMP-u-STAFF, 1 Investment Place, Towson, MD 21204. Or, CALL COLLECT (301) 828-0788.

Comp-u-Staff®

We hire and promote equally.

DART®

MEETING THE NEEDS OF TOMORROW

This is your opportunity to join Dart Container Corporation, an innovative industry frontrunner in the production of plastic products and a company who realizes how important the efficient management/processing of information is to continued success. Due to our impressive growth, we have the following positions available in our advanced Lansing facility.

DATA PROCESSING MANAGER - Requirements include a strong background in systems analysis, design, management and programming. You must also have a BS in computer science or a similar discipline plus IBM 38 experience.

PROGRAMMER - This position demands 2 years programming experience with an IBM 38.

We offer a stimulating technical environment, ample room for professional development, and much more. For prompt attention forward your resume to:

Dart Container Corporation
Corporate Recruiter
500 Hogsback Rd.
Mason, MI 48854

DART CONTAINER CORPORATION

MASON, MICHIGAN 48854

An Equal Opportunity Employer M/F

Consultants Information Systems and EDP

The San Francisco office of our international management consulting firm is in need of strong Information Systems and EDP consultants who can provide quality client service and contribute to the business development of our rapidly growing practice.

Successful candidates will have had a minimum of four years' project manager experience in design and development of automated systems in addition to a good technical knowledge of current EDP systems technology including HP-3000, IBM System 38, DEC VAX and micro-computers. Strong written and oral communications skills are a must.

You will participate in a wide range of projects including system planning, hardware/software selection, systems design and implementation, as well as management reviews of data processing and operations.

Candidates should be able to work effectively with all levels of management. Prior consulting experience highly desirable. Advanced degree preferable. Salary commensurate with experience. Minimal travel.

If you believe you qualify, reply in confidence with resume and salary history to Arthur Young & Company, Management Consulting Group, 1 Post Street, San Francisco, California 94104. An equal opportunity employer M/F.

We take business *personally.*

A MEMBER OF ARTHUR YOUNG INTERNATIONAL
Arthur Young
Hoping to hear from you!

DP CONSULTING OPPORTUNITIES

OCLC, Online Computer Library Center, the world's leading computer library service and research organization, with a network of over 5500 work stations has openings at its Columbus, Ohio headquarters in the areas of applications development and systems engineering.

- **CONSULTING SYSTEMS ANALYST —** UNIX/C, telecommunications/networking (X.25, 3780, IEEE 802, LAN) in a development environment are required. IBM PC/DOS, Assembly, PL/1, COBOL and experience in interactive systems design are desirable.
- **CONSULTING SYSTEMS ANALYST —** State-of-the-art knowledge of software/hardware systems design and development techniques in database systems, telecommunications and networking are required. An in-depth knowledge of UNIX operating systems and C programming language are also required with experience in Assembly, PASCAL and PL/1 highly desirable.
- **SENIOR SYSTEMS ANALYST —** UNIX/C, telecommunications/networking (including implementation in the lower levels of the OSI model) in a development environment plus project management experience are required. IBM PC/DOS, Tandem TNS-II or TXP under Guardian, T/TAL, COBOL, and experience in interactive systems design are desirable.

All positions require a BS in computer science or equivalent experience, excellent verbal and written communication skills, knowledge of structured analysis and design techniques and a minimum of 7-8 years experience in a mainframe/mini environment.

OCLC offers a comprehensive company-paid benefits package including 4 weeks vacation, an attractive working environment, assistance with relocation and salaries commensurate with experience. Interested parties should submit their resume and salary history to the address below, or phone (614) 764-6097.

OCLC Human Resources Department — CW-2
6565 Frantz Road • Dublin, Ohio 43017

OCLC

Online Computer Library Center

An Equal Opportunity Employer M/F

N C R
PROGRAMMER/ANALYST

FDS, Sarasota-based financial data processing service company needs experienced people knowledgeable in Commercial. Banking and/or Savings and Loan applications. Experience in NCR CIF or IRFS desired. NCR Systems Software experience helpful. Salary open. Send resume to:

Florida Data Service
1390 Main Street
Suite 600
Sarasota, FL 33578

Or Call Gloria at:

(813) 952-0891

Principals Only

S/38

We specialize in placing IBM S/38 candidates. Employers who have S/38 equipment retain our services. We have numerous positions throughout the U.S. for Systems Analysts, Programmer Analysts, Programmers with salaries from $22,000 to $45,000. We have several D.P. manager openings. Salary starting at $40,000 going up to $70,000.

Resource Placement Group III — Contact Paul Martin

P.O. Box 83
Waterloo, IA 50704
(319) 232-6641

Subsidiary of City & Nat'l Employment, Inc.

DIRECTOR OF SYSTEMS DEVELOPMENT

Fortune 1000 organization has an immediate need for a solid manager with 5+ years experience in a management capacity to direct the efforts of several project managers. Overall staff could approach 30. Excellent visibility & advancement potential. Salary to $55,000.

Randy Pace or Warner Coffman

ROBERT HALF OF ST. LOUIS
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

IMS/VS DB/DC ONLINE PROGRAMMING USING MFS AND DL/I — By David Lee

Brand new, just published. The first complete and practical guide to IMS/VS DB/DC Online programming using MFS and DL/I. It is based on IMS/VS DB/DC latest version, 1.3. All examples and sample programs are written in COBOL. It covers all the basics of IMS/VS online programming. You don't known how easy it is to learn IMS/VS online programming until you try this book. 245 examples illustrate the use of MFS control statement, DC commands, MPP and BMP programming and BTS testing. Nine sample online programs address all major applications. The contents are printed in two colors. It's in big 8.5 × 11 size, 310 technique-packed pages. MFS format coding, Data Base and Data Communication DL/I calls, MPP and BMP program structure, coding, and testing, Debugging, BTS II JCL set up and testing under TSO and much more! Sample online programs include: Menu, Add, Update/Delete, Browse, Print, MPP using two screen formats, and independent MPP program design and coding. $29.95 for 1 copy or $24.95/copy for 4 copies or more.

CICS/VS COMMAND LEVEL PROGRAMMING WITH COBOL EXAMPLES — By David Lee

A complete and practical guide to CICS command level programming. It's based on CICS latest release 1.6, written in COBOL, with special emphasis on VSAM. It covers virtually every CICS technique you'll ever need. 273 examples illustrate the use of CICS commands. 15 sample programs address all CICS major applications. The contents are printed in two colors. It's in big 8.5 × 11 size, 295 technique-packed pages. The author's hands-on experience makes the difference. BMS map-set coding, CICS program structure and coding, Pseudo Conversational programming, Message Routing, Online report printing, VSAM file handling, CICS internal tables set up, CEDF debugging, Dump reading and much more! Sample programs include: Menu, Add, Update, Delete, Browse, Browse/Update, 3 report printing techniques, complete VSAM setup and manipulation, Alternate Index processing, Screen Refreshing technique, Auto Task Initiation (ATI), Independent transaction design and coding and much more! Over 10,000 copies have been sold. This book has been adopted by Purdue University and many other colleges as the textbook for online programming. $29.95 for 1 copy or $24.95/copy for 4 copies or more.

To order, call TOLL FREE 1-800-851-5072 or 214-248-7642 (in Texas). To save S & H charges, send $29.95 for 1 copy or $24.95/copy for 4 copies or more in check to: CCD Online Systems, Inc./P.O. Box 795759/Dallas, TX 75379. Allow 1 to 2 weeks for delivery. You must be completely satisfied or you may return it at any time for a full refund.

CCD ONLINE SYSTEMS, INC.
TOLL FREE 1-800-851-5072
16990 Dallas Parkway, Suite 151. Dallas, TX 75248

Give us your resume

We'll give YOU San Francisco!

Some people come to sail on the Bay, some come to ski in the Sierras, and some to snorkle in Santa Cruz. But the professional climate is the real reason, and every bit as exciting.

There's nobody better qualified than CRG to introduce you to San Francisco. We've been here longer -- over 12 years -- know everyone in EDP worth knowing, and our list of client companies is like the Who's Who of the business world. So send us your resume today, or call. All fees are paid by our clients, many of whom will also assume interview and relocation expenses.

Computer Resources Group, Inc., agency
303 Sacramento St., San Francisco, CA 94111, (415) 398-3535; or
3080 Olcott St., Santa Clara, CA 95051, (408) 727-1658

CRG — AFFILIATES IN 27 MAJOR U.S. CITIES — National Computer Associates

An employer-retained professional placement service

IMS/CICS CHICAGO
1-800-792-3504 Ext. 529

Requires 3 or more years experience with programming and/or systems development. DB experience a plus. Salaries to $60,000. Call Mark Bennett, Mgr. DP Div.

Dunhill
of Milwaukee
735 N. Water St.
Milwaukee, WI 53202

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from

Computerworld classifieds.

Call or write for more information:

Computerworld
Box 880
375 Cochituate Road
Framingham, MA 01701

800-343-6474
(617)879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

NEW ENGLAND

BOSTON
EDP AUDIT SUPVR.
Prominent BOSTON CPA firm seeks lead tech. auditor for diverse engagements. Knowl. of IBM mainframes, PC's & SW pkgs. desired. Limited trvl. concentrated in NE + mgr. oppty. Salary to $50,000.

BOSTON
HP3000 SENIOR P/A
Leading hi-tech. mfg. co. seeks tech. astute P/A for expanding projs. Environ. is HP3000 IMAGE COBOL COGNOS pkgs. Oppty. to provide guidance to prog. team while aiding mgmt. in analysis & design. $35,000.

BOSTON
BUSINESS SYS. ANALYST
Prestigious Internat. fin'l. svcs. firm has outstanding oppty. for accomplished sys. analyst looking for new challenges. Evaluate user requirements, design new opns. sys. both foreign & domestic. Advancement potential. Previous consulting, opn. acctg., VAX/VMS & BASIC pref. Travel req. $33,000.

HARTFORD
IMS DB/DC
CT client seeks IMS tech. pro's. Will lead in performance, data base tuning, optimization & design. These are corp. positions offering tech. challenge, hi-visibility & excellent growth. Full reloc. & outstanding benefits. Salary $33,000 to $45,000.

HARTFORD
SYSTEMS PROG.
Exp. MVS sys. prog. oppty. to lead installation of MVS/XA software in a multi-CPU suburban CT loc. Excellent growth oppty. Min. 4+ yrs. MVS exp. req. Salary to $42,000.

PROVIDENCE
EFTS PROJECT MANAGER
Strong proj. leader needed to manage & control all aspects of a major ERTS proj. Banking apps. exp. desired. Exp. w/ATM/POS sys. or fault-tolerant hardware/software a +. $38,000.

ROBERT HALF

R|H ®

EDP PERSONNEL SPECIALISTS
Contact the Manager of any office listed below.
100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
900 Turks Head Bldg., Providence, RI 02903
(401) 274-8700
Client Companies Assume All Fees.

CAREER OPPORTUNITIES IN MIS

Rubbermaid Incorporated, a leading producer of plastic housewares and commercial products, will be installing an IBM 4381 using an MVS/XA Operating System and staffing the following positions:

Data Base/ Data Communications Specialist

Maintains and supports data base system software and communications software. Will work with CICS and IDMS with over 300 on-line terminals at 10 locations. The ideal candidate will have strong consulting and problem solving skills.

Systems Programmer

Will assist in the installation of IBM 4381 and MVS/XA System. Update and maintain system software and provide support to operations and analyst/programmers. Will be involved in the training and education of users and managers.

Data Network Specialist

Coordinates acquisition, installation and support of data communications equipment. Functions in a service role to provide quick resolution to data communication and remote terminal problems. Position features network design for 10 location system and local area network.

Competitive compensation and fringe package. Send resumes to **C. John Grom, Manager, Executive Recruitment.**

Rubbermaid®

RUBBERMAID INC.
1147 Akron Road
Wooster, Ohio 44691

An Equal Opportunity Employer M/F

MIAMI DADE COMMUNITY COLLEGE - South Campus

TELECOMMUNICATIONS AND HARDWARE SPECIALIST

Responsible for the operational integrity and performance of all data communications network and computer hardware assigned to Computer Operations. Will monitor computer hardware and data communications services, coordinate all computer hardware and data communications network problems to ensure proper solution and follow-up. **REQUIRES:** Bachelor's Degree in an appropriate field from an accredited college or university. Four years of progressively responsible in-depth experience in data processing, telecommunications, and/or electronic field engineering with one year at the supervisory level and PBX-based telecommunications systems experience desirable. **SALARY:** $25,692 Minimum with Liberal Employee Benefit Program.

Submit two copies of resume, academic credentials and letters of reference to:

Personnel Services
11011 South West 104th Street
Miami, Florida 33176

AN EQUAL ACCESS/EQUAL OPPORTUNITY COMMUNITY COLLEGE

ANALYST/PROGRAMMERS

Immediate career opportunities for 2 experienced professionals. One position requires strong COBOL skills, and knowledge of database & Honeywell systems is preferred. The second position requires strength in Basic and/or Point-of-Sale applications.

We are a rapidly expanding multi-billion dollar corporation, located in a major Sunbelt city. Our salaries are competitive, and our benefits are extensive (including relocation). Continuing training, career pathing, and advancement has contributed to our extremely low employee turnover.

For immediate consideration, please submit a detailed resume including salary history, to Box # CW-B4632, Computerworld, Box 880, Framingham, MA 01701

DATA PROCESSING: Tenure track, Asst. or Assoc. Prof. Instruction and coordination of an associate and B.S. degree business data processing programs. Qualifications: Masters degree with substantial course work in data processing and three years business/industrial experience. Doctoral degree, five years business/industrial experience and higher education teaching experience prefered. Business/industrial experience is a critical requirement. Send letter of application, resume, transcripts and three references to: Tom Sutherlin, Chairman, Data Processing Search Committee, Cameron University, P.O. Box 16356, Lawton, OK 73505 by May 20, 1985. EOE/AA.

COMPUTER SYSTEMS ANALYST to formulate the logic of systems and procedures and implement new or improved systems for both manual and automated applications. May act as systems project manager on small to medium sized applications. Additionally to perform departmental work measurement, organizational analysis, records management and communications studies. Analyze business problems and requirements, investigate alternative solutions and recommend approaches based on cost/benefit analysis and feasibility studies and other assignments as deemed necessary by departmental management. BBA in management, with 6 years on-the-job experience required. Salary $2,500 per month, 40-hour week. Send resumes to: 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #13385.

This ad paid by employer.

COBOL PROGRAMMERS/ ANALYSTS

Multiple opportunities in attractive SE locations from SC to VA; 2-7 years experience using COBOL in IBM mainframe environment; knowledge of JCL, IMS, OS/MVS, TSO, and MRP; starting salaries from low $20's to mid $30's depending on experience. For more information, send resume or call

Dan Daniel or Jim Jerome
at 803/271-6350
Phillips Personnel Services
Post Office Box 5664
Greenville, SC 29606

SYSTEMS ANALYST

The Roman L Hruska U.S. Meat Animal Research Center invites applications for the position of Systems Analyst. This is a University of Nebraska position. The position is responsible for installation and maintenance of system software and represents the Center with hardware maintenance contractors. A new supermini computer system is proposed for the Center. Training on the new system will be provided. B.S. in Computer Science or related area and 3 years of quality experience required. Some knowledge of agriculture desired. Salary range $24,000 - $26,400. Send resume, transcripts, and list of 3 professional references to: Mr. Terry Madson, Personnel/Business Officer, U.S. Meat Animal Research Center, Box 166, Clay Center, Nebraska 68933. Application deadline May 29, 1985. The University is an AA/EEO employer.

WE'LL MATCH YOUR SALARY. RAISE IT. AND, GIVE YOU TIME AND A HALF FOR OVERTIME.

CGA knows top-notch programmers and analysts are a sure bet to the success of our national contract consulting business. So we up the ante in salaries and benefits to get the qualified consultants we need to satisfy our consulting contracts.

- UNIX C
- INFORMIX
- TANDEM
- IDEAL
- DATACOM
- DBA'S
- HP300
- CICS
- FOCUS
- AS-IST
- MODEL 204
- DB2
- VAX
- HW OAS
- DPS7
- BASIC+
- IDMS
- IMS DB/DC
- TECH WRITERS
- NETWORKING
- UNIVAC 1100
- DMS

Don't gamble with your career. Deal yourself a winning hand with CGA. Call us collect today at 305-857-8884. (SUBCONTRACTORS WELCOME)

CGA Computer, Inc.
7040 Lake Ellenor Drive
Suite 126
Orlando, FL 32809

DATA PROCESSING

Harry and David®

Jackson & Perkins Co.®

PROGRAMMER/ANALYSTS

Enjoy technical challenge AND the Oregon lifestyle!

You don't have to sacrifice your living environment in order to work at the leading edge of applications development. At Bear Creek Corporation, a subsidiary of R.J. Reynolds, we work on an IBM-compatible mainframe system running MVS and TSO/SPF. We have several openings now to create new programs for our marketing, business and financial systems.

We're a stable, growing company that markets garden products, fresh-fruit and gourmet-food gifts directly to the consumer through our two principal subsidiaries, Jackson & Perkins Co.® and Harry and David® . We're also a thriving member of a community that combines the best in cultural, recreational and educational resources with the affordable home-town lifestyle you may be seeking.

If you have at least 2 years' experience with ALC and you're ready to trade big-city congestion for Southern Oregon, we can offer you assignments that will challenge your creativity, a competitive salary, excellent benefits, and fully-paid relocation assistance.

Interested? Send your resume and informative cover letter with salary requirements to: **Kent Granat, VP-Human Resources, Bear Creek Corporation, P.O. Box 299, Medford, OR 97501.**

We are an equal opportunity employer.



BEAR CREEK CORPORATION

BUY - SELL - SWAP

CLIP AND MAIL

ECONOCOM

SERIES/1 AND SPECIAL PRODUCTS
BUY • SELL • LEASE
NEW OR USED
• ALL PERIPHERALS
• 4956-B AND E NOW!
• ATT AND WANG

3411-3 SINGLE & DUAL FOR S/38 OR 4300
AVAILABLE NOW!

• 3350-A2
• 3350-B2, B2F
• 3350-C2
LOWEST PRICES EVER! AVAILABLE NOW!!!

• 4341-L1
• 3420-6 SINGLES
• 3420-7 SINGLES
• 3420-5 DUALS
WILL SHIP TO YOU THIS WEEK!

INVENTORY SALE
• 3540-B1 • 3278-2
• 3262-B1 • 5340-F3X, E3X
• 8809-2, 3 • 3370-A12, B12
• 3276-2 • 3791-1
• 3203-5 • 3761-1
• 5225-1 • 6703-25
• 2501-B1, B2 • 3375-A1, B1
• 4361 MEMORY AND FEATURES

SYSTEM/36
CALL FOR PROMPT QUOTE!

Find out more about ECONOCOM. Clip this ad, attach your business card and mail it to us. We'll send you a copy of our New Capabilities Brochure plus a complimentary copy of our Computer Market Advisor.

SPECIAL: AVAILABLE TODAY
3287-2
8700
8331
CART. RIBBON
$3,500 EACH
QUANTITY AVAILABLE!

SPECIAL OFFER!
3178-C2 $33/MO.-24 MOS.
OR
$29/MO.-36 MOS.
IMMEDIATE AVAILABILITY!

WANT TO BUY
• 3705 • 3375's
• 3864 • 3420's
• 5381 • 3081-K
• 5360 • 3083-J
• 3380's • 4341-2, 12
• 3880's • 5224-2
• 5291-1 • 5340

ECONOCOM ...IN MANY INSTANCES, "RIGHT IN YOUR OWN BACK YARD".

ECONOMIC COMPUTER SALES, INC.
CORPORATE OFFICES
845 CROSSOVER LANE
P.O. BOX 240297
MEMPHIS, TENNESSEE 38124
901-767-9130 OR 800-238-3098

• ACTON, MA 617-264-4422
• ATLANTA, GA 404-992-1334
• BIRMINGHAM, AL 205-823-6568
• BOULDER, CO 303-449-1958
• DALLAS, TX 214-256-8563
• LITTLE ROCK, AR 501-224-6242
• LOS ANGELES, CA 714-852-0831
• LOUISVILLE, KY 502-589-1376
• MIAMI, FL 305-758-4949
• NEW YORK, NY OPENING SOON
• TULSA, OK 918-493-5015

ECONOCOM ADHERES TO THE HIGH STANDARDS OF ETHICAL CONDUCT REQUIRED FOR MEMBERSHIP IN:
CDLA AEL ASCOM
CW-C

CLIP AND MAIL

ECONOCOM is a service mark of Economic Computer Sales, Inc.

HP
1000
SERIES E,F,M
3000
SERIES II, III,
33, 48B

7925 120 MB DISK DRIVE
7970E 1600 BPI TAPE DRIVE
2631B 180 CPS PRINTER
2392A TERMINAL & MUCH MORE
2686A LASER JET PRINTER
2608A LASER PRINTER
7978A TAPE DRIVE

TELEX 756927
encore
(213) 452-9117

When You Think Of Leasing Anything, Think Of Comdisco

For Sale Or Lease

3083/3081	3178/3180/3278
4331/4341	3800-1/-3
3380/3880	Inquire About Our Lower Than VPA Lease Rates Without Quantity Commitments
3370/3375	Fill In Short Strings on Short Terms
3420-4/-6/-8 3803-2	If You Cannot Wait For 3480 - Do A Short Term 3420 Lease
3725	Quick Delivery
3705	Quick Delivery
4245/4248	Quick Delivery

Wanted To Buy

3083/3081	3830
3375	3803-2

COMDISCO®

Eastern Region
Connecticut* 203/655-1211
Carlstadt, NJ 201/896-9500
Washington, DC ... 301/441-1000
Philadelphia, PA ... 215/545-8035
Boston, MA 617/542-4005
Red Bank, NJ 201/842-5111

Midwestern Region
Chicago** 312/698-3000
Michigan 313/644-1500

South Central Region
Dallas* 214/641-3255
Houston, TX 713/445-1815
Atlanta, GA 404/256-5856
Florida 305/428-3177
Charlotte, NC 704/335-0804

Western Region
San Francisco* ... 415/944-1111
Los Angeles 213/436-7757

*Regional Headquarters
**Corporate Headquarters

When you need additional DEC* computer hardware, check the inventory of over 40,000 CPU's, peripherals and options at

Midwest Systems

☐ VAX*
☐ PDP*-11
☐ LSI-11*
☐ OPTIONS/PERIPHERALS
☐ CUSTOM CONFIGURATIONS

Midwest Systems, Inc. provides DEC* computer hardware, from add-on components and peripherals to custom configured systems. Your hardware arrives fully refurbished and eligible for DEC* Maintenance—ready to start life anew.

(800) 328-7000

Or in Minnesota, (612) 894-4020. Call your Account Representative to receive our current promotional catalog.

MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

*A trademark of Digital Equipment Corporation

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE
LEASE, RENT
AND SERVICE OF
Data General
EQUIPMENT



New York
516-467-2500
California
415-849-9635
Telex
510 222-0880

FORSYTHE McARTHUR ASSOCIATES, INC.

USED IBM 3380 AA4's, B04's

for sale or lease
with or without 3880's

available May '10

Hdqtrs: Skokie, IL (312) 675-8000

Atlanta (404) 953-9457
Denver (303) 980-3407
Detroit (313) 332-1272
Milwaukee (414) 785-9544
Stamford, CT (203) 359-5649
St. Louis (314) 991-1716

Sell IBM S/1 34
38 UPGRADES Lowest Prices
Call Collect 404-252-7480
DATAMARC
6085 Roswell Rd. Suite 320 Atlanta, GA 30328
36
We Pay Highest Prices For S/34's

As a full-service leasing company, we won't fill you with empty promises.

A lot of leasing companies promise you everything. But, the fact is, if they're not full service, they don't have a leg to stand on. At Greyhound Capital Corporation, we can promise a lot, because we are a full-service leasing company.

That means you get the best advice, the best service, the best financing, and of course, the best equipment we have to offer. And you can only get this kind of complete service from a full-service leasing company.

At Greyhound Capital Corporation, we've been leasing, servicing, refurbishing, maintaining and providing financing for computers and other equipment for over 20 years. In other words, we can deliver the goods. Be it financing, maintenance or leasing terms.

So remember, if your leasing company isn't full service, then they're filling you with empty promises.

Regional Offices

Brian de la Houssaye	Eastern Regional Headquarters	**(617) 272-8110**
Mike Bantz	Western Regional Headquarters	**(415) 283-8980**
Mike Flannery	Central Regional Headquarters	**(312) 789-9100**
Ron Geil	Southern Regional Headquarters	**(512) 451-0121**

Sales Offices in:
Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco.

Canada Group

Gordon Clarke	Canadian Headquarters	(416) 366-1513

Greyhound Capital Overseas Corporation

Don Haworth	International Headquarters Offices in London, Paris, Geneva, Munich	(214) 233-1818

Greyhound Capital Corporation

A subsidiary of The Greyhound Corporation

© 1985 Greyhound Capital Corporation

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

XL datacomp INC.

907 N. Elm St. Hinsdale, IL 60521

System/ 38

- Models 5,6,7,8
- All Upgrades
- National References

Series/1

- New & Used
- Buy-Lease-Sell

Displaywriters

Ask about our Maintenance. . .

Quality service at substantial savings! Available in these areas:

New York City, New Jersey, Connecticut, Chicago, Philadelphia and Los Angeles.

3 Regional Warehouses To Better Serve You

Displays		I/O	Printers	
■ 3180	■ 5291-1 & 2	■ 3411	■ 3262	■ 5225
■ 5251-11	■ 5294	■ 3370 A & B	■ 5219	■ 5256
■ 5251-12			■ 5224	■ 5262

System/34

- All Models
- Upgrades

Leasing Program

"Setting a New Standard"
"Low Cost – Simple – Great Flexibility"

Excellence is Our Standard

Chicago, IL **312/323-1200**
Atlanta, GA **404/951-2801**
Dallas, TX **214/991-2313**
Houston, TX **713/973-0293**
Springfield, NJ **201/467-8686**
Philadelphia, PA **215/687-4900**
Los Angeles, CA **714/671-3911**

System/ 36

- All Models
- Fast Delivery

Want to Buy

- System/38
- System/36
- System/34
- All I/O

Call Toll Free
800/323-3289
Ask for our Catalogue

SYSTEMS
4341 4331
38 36 34
SERIES 1
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE

CB

Call TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

asca MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

MEL CDPA

EL CAMINO RESOURCES LTD.

3083E
16X16
AVAILABLE IMMEDIATELY
Sale or Lease

•

3090-200
AVAILABLE DEC. 1985
Lease Only

•

WANT TO BUY
3083/3081
Fourth Quarter 1985

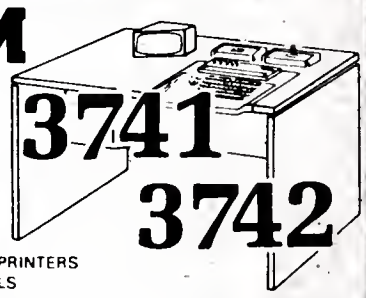
Call MEL KLEINMAN
(800) 821-0229 (818) 986-2411
In California

EL CAMINO RESOURCES LTD.
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

Buy - Sell - Lease

S/34
S/36
S/38

IBM



3741
3742

UPGRADES
CPU's CRT's- PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

asca MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

1-800-251-2670
In Tennessee: 615-847-4031

3480's

Available June/August

* ITC Qualified

* Will Purchase Installed 3420's

Call Allison Stein
(203) 324-9495

Stamford Computer Group, Inc.
74 West Park Place
Stamford,
CT 06901

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 999, due 3:30 p.m., Tuesday, May 21, 1985, for the acquisition of MS DOS based microcomputers, peripherals and printers for computer assisted curriculum labs at the University of Southern Mississippi.

Request for Proposal No. 1000, due 3:30 p.m., Thursday May 23, 1985, for the acquisition of consulting services in designing and developing a system for the management of the Mississippi Secretary of State's Corporate and UCC records.

Request for Proposal No. 1001, due 3:30 p.m., Thursday May 23, 1985, for the acquisition of a turnkey MUMPS/OS-based system to address the administrative and medical records management needs of the University of Medical Center Department of Family Medicine.

Request for Proposal No. 1002, due 3:30 p.m., Thursday May 16, 1985, for a distributed processing system for the Mississippi State Treasury Department.

Request for Proposal No. 1003, due 3:30 p.m., Thursday May 23, 1985, for the acquisition of two multiprogramming minicomputers for the Jones County Junior College's administrative offices and their vocational-technical training department, respectively.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Lisa Winstead or Elaine Knauss,
State Central Data Processing Authority
601/359-1395

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	**$4.95 ea.**
1200' Reel	**$4.25 ea.**
600' Reel	**$3.50 ea.**

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

IBM UNIT RECORD EQUIPMENT
DISK PACKS—DATA MODULES—MAG.TAPE—DISKETTES



SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)

MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION
5633 W. Howard St. Chicago, IL 60648
800-621-3906 (IL-312-647-0880)

VAX
SYSTEMS FOR SALE

730-ZA	1 MG (64K), RUA80-CA,RL211-AK,TU80-AA, DMF32, LA100-CA, H9642, BA11-L, DD11-DK, VMS	4/15
780	8 MG (64K), RUA81-CA, RA81-AA, TU80, 3 - DMF32, BC27A-30, LA100-BA, H9652-MF, BA11-KU, 2 - DD11-DK, VMS, Fortran	4/15
780	4 MG (64K), H9602-DF, BA11-K, DD11-DK, DMF32, VMS	5/15
750	5 MG (64K), TU80-AA, DMF32-LP, DEUNA-AA, H9642, BA11-K, DD11-DK, VMS	5/30
785	10 MG (64K), REP07-AA, RM03-AA, DZ11-E, DEUNA-AA, H9602-DF, BA11-K, DD11-DK, VMS	5/30

CALL
C. D. SMITH
(713) 451-3112

MODEMS

And Data Communications Equipment
PRICE EXAMPLE
Paradyne LSI9600-$595
MICOM 818MUX-$995
LARGE INVENTORY. FULL WARANTEE
Computers & Business, Inc.
705 D. Louis Avenue
Holiday, FL 33590
Please call.
813-934-9665
813-938-7025
Telex # 6502303233

Check us out

SPECIALS
11 73, VAX 730, 750, 780

for DEC

and/or
DEC serviced compatibles
VAX 780, 750
11/73, 70, 44, 34, 23
All immediate & guaranteed
Everything from 11/23 to VAX

DATAWARE
SYSTEMS LEASE
800-221-6318
30 Bay St. S.I., N.Y. 10301
(718) 447-4911 TELEX 429394
TWX 710588-6738
DEC is a registered trademark of Digital Corporation

THE SOURCE FOR series/1
ECONOCOM

• BUY • SELL
• LEASE
NEW OR USED

ECONOMIC COMPUTER SALES, INC.
845 CROSSOVER LANE
P. O. BOX 240297
MEMPHIS, TENNESSEE 38124
(901) 767-9130 or
(800) 238-3098
CDLA Member Computer Dealers & Lessors Association
AEL AMERICAN ASSOCIATION OF EQUIPMENT LESSORS

RANDOLPH MIPS OF THE MONTH

APRIL 1985

Copyright 1985 Randolph Computer Corporation

IBM

SYSTEMS	MIPS (Millions of Instructions Per Second)	MEGABYTES
4321	0.25	1
4331-1	0.25	0.5 to 1
4331-11	0.38	1 to 2
4331-2	0.50	1 to 4
4341-9	0.52	1 to 4
4361-3	0.70	2 to 4
4341-10	0.75	2 to 4
4341-1	0.88	2 to 4
4341-11	1.1	2 to 8
4361-4	1.15	2 to 12
3031	1.2	2 to 8
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
3031AP	2.0	2 to 8
4381-1	2.1	4 to 16
3032	2.5	2 to 8
4381-2	2.7	4 to 32
3033S	2.9	4 to 16
•3083CX	3.3	8 to 32
•4381-3	4.0	8 to 32
3083E	4.2	8 to 32
3033N	4.3	4 to 16
3083X	4.4	8 to 32
3033UP	5.0	4 to 24
3083B	6.3	8 to 32
3083BX	6.6	8 to 32
3083J	8.4	8 to 32
3033MP	8.5	8 to 32
3033AP	8.5	4 to 24
3083JX	8.8	8 to 32
3081D	10.0	16 to 32
3081G	11.0	16 to 48
3081GX	11.9	16 to 64
3081K	14.0	16 to 48
3081KX	15.5	16 to 64
3084G	26.6	32 to 96
3084QX	28.7	32 to 128
•3090-200	29.4	64 to 192
†3090-400	52.9	128 to 384

• First Installation 1985 †First installation 1987

AMDAHL

SYSTEMS	MIPS	MEGABYTES
470V/7A	4.5	8 to 32
470V/7	5.5	8 to 32
470V/8	6.5	8 to 32
5840	8.4	16 to 64
5850	11.6	16 to 64
5860	14.0	16 to 64
5867	22.0	24 to 64
5868	22.0	32 to 128
5870	26.6	16 to 64
5880	26.6	32 to 128

NATIONAL ADVANCED SYSTEMS

SYSTEMS	MIPS	MEGABYTES
AS/8043	5.2	8 to 32
AS/8053	6.5	8 to 32
AS/8063	8.4	16 to 32
AS/9040	7.2	8 to 48
AS/9050	9	8 to 48
AS/9060	11.2	16 to 64
AS/9070	16.2	16 to 64
AS/9080	20	16 to 64
†AS/XL-60	28	32 to 256
†AS/XL-80	50	64 to 256

†First installation 1986

The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based upon hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, NOW.

Whatever your computer system needs, talk to Randolph now. We can deliver the hardware when you need it ... and ease the pressure on your DP budget with low lease rates. Call William Rooney, Vice President, **800-243-5307**.

537 Steamboat Road
Greenwich, CT 06830
203-661-4200 • 800-243-5307

Randolph

TWENTIETH 1965 Randolph 1985 ANNIVERSARY

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION **RANDOLPH COMPUTER CORPORATION** *A subsidiary of* THE FIRST NATIONAL BANK OF BOSTON **BANK OF BOSTON**

1 DAY SHIP

VAX*
11/780
UNIT OR CLUSTER

Lease or Buy
617-437-7600
AMERICAN USED COMPUTER
P.O. Box 68-Kenmore Station.
Boston MA 02215
DEC SALES & LEASING SINCE 1968
*VAX is a Trademark of Digital Equipment Corp

SALES LEASING

TexCom
1-800-833-9119

S/36 S/38
SERIES/1

4300, S/34, DISPLAYWRITERS AND ALL PERIPHERALS.

ascd CDLA (901) 756-7055 IN ALASKA, HAWAII AND TENNESSEE
6750 POPLAR AVENUE, SUITE 204 • MEMPHIS, TENNESSEE 38138 AEL

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

1-800-IBM®-USED

The only number you need to call for your IBM computer requirements.

IBM is a registered trademark of International Business Machines

Save Money On Your Present Equipment With Our Purchase/Leaseback Program

ALL UPGRADES

DISK 3340 3350 3370 3375 3380

TERMINALS 3178 3278 3274 3180 5251/91 PC/XT

PRINTERS 5224 5225 5256 3203 4245 3262

TAPE 3411 3420

LEASING SHORT OR LONG TERM NEW OR USED

4300 3033 308X New or Used

SYSTEM 38 New or Used

SERIES 1 DISK TAPE PRINTERS FEATURES New or Used IBM & CDC CPU's ALL MODELS

SYSTEM 34/36

BUY SELL LEASE IBM Maintenance Guaranteed, Equipment Configured to Your Requirements.

IF IBM MAKES IT, WE CAN SAVE YOU MONEY — whether you buy, lease or rent from us. We also need to buy your owned or rental credit equipment. Call us for a quote.

Marshall Lewis & Assoc., Inc. ML &A
P.O. Box 19601, Irvine, CA 92713
1-800-IBM-USED
In California (714) 472-0234
CDLA Member Computer Dealers & Lessors Association

Sale Or Lease

3090-200 11/85

3380-AD4/BD4 6/85

3380-J23 or **003** 6/85

David Goldner
Wesley Associates
(201) 488-4200

3375 A & B Models Avail: 8/1/85 Sale/Lease

4341's / 4381's Sale/Lease

Printers 3203 3211 1403 3800 4248 4245 3262 3289 3287 Immediate Delivery

Controllers 3880 3274 3803 3276 Display Stations 3278 3178 3279 3277

DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery

TAPE DRIVES 3420 3430 3410 8809 Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

Computer Marketing Inc.
P.O. BOX 0, MARGATE, NJ 08402-0430
609/823-6000
Contact/Bernie Gest
CDLA

Established 1969

ALR ARCANE LEASING RESOURCES ALR

StorageTek IBM

CALL BEFORE YOU BUY OR SELL...
You can't afford not to!
(201) 574-1000

BUY
StorageTek
4500's
3670's
4305's
PRINTERS
IBM
CONTROLLERS
3370 ● 3375
3420-8

SELL
StorageTek
4500's
3670's
3650's
PRINTERS
IBM
3350's
3420-8

ALR ARCANE LEASING RESOURCES
35 Walnut Avenue, Clark, NJ 07066 • (201) 574-1000

BUY ★SELL ★LEASE ★SHORT TERM RENT

IBM Displaywriters —NEW or USED

FEATURES AND UPGRADES–DATAMASTERS
5520 OFFICE ADMINISTRATIVE SYSTEMS
Immediate Delivery
SYSTEM/34/36

CDB FINANCIAL, INC.
6220 Jim Miller Road
DALLAS, TEXAS 75228
(214) 324-3491

CDLA Member Computer Dealers & Lessors Association

WORLDS' #1 DEC DEALER

AMERICAN

IMMEDIATE DELIVERY

DEC*

NEW & USED

Systems • Peripherals • Options • Memory
In Stock — Ready to Ship
LEASE OR SALE
617-437-7600

VAX 780's Ready to Cluster
COMPLETE WITH RA81's WITH DEC INSTALLATION

DEC SALES AND LEASING SINCE 1968

AMERICAN USED COMPUTER
P.O. Box 68, Kenmore Station, Boston, MA 02215

*DEC is a trademark of Digital Equipment Corp

IBM® HARDWARE

• BUY
• SELL
• LEASE

SERIES-1
34 • 36 • 38 • 23

4300 3370 327X 3803

Upgrades
Tubes • Printers • Tapes • Disks

PCs

AMCOM CORPORATION
5200 W. 73RD ST.
MINNEAPOLIS, MN 55435
(612) 835-4737

CALL TOLL FREE
1-800-328-7723

FORSYTHE McARTHUR ASSOCIATES, INC.

USED IBM 4381-2 Processor

for sale or lease — available June 10

Hdqtrs: **Skokie, IL (312) 675-8000**

Atlanta (404) 953-9457
Denver (303) 980-3407
Detroit (313) 332-1272
Milwaukee (414) 785-9544
Stamford, CT (203) 359-5649
St. Louis (314) 991-1716

3725 LEASES
Your Position or Ours
Centron DPL Company
The company that understands communications
1-800-532-7532
In Minnesota Call 612-944-9161
Member CDLA

Complete LITTON 1600 Computer System

includes work station,
8 port MUX,
Data Comm interface,
10 Meg Disk Drive, and Printer
Unit in working order
FOB Lexington KY.
Contact Bob Rhoa
800-253-2888.

DATA GENERAL

We Buy, Sell And Service
New And Surplus Systems and Peripherals
Call Or Write
Hanson Data Systems
(outside Mass. toll free) 1-800-225-9216
(within Mass.) (617) 481-3901
P. O. Box 27, Southboro, MA 01772

BUY SELL TRADE

DEC SYSTEMS PERIPHERALS COMPONENTS
•LSI
•PDP
•VAX

dce™ DIGITAL COMPUTER EXCHANGE INC
27773 Industrial Blvd., Hayward, CA 94545
CALL (415) 887-3100
(800) 872-3100 (except CA)

We Buy & Sell
DEC
Systems
Components

Digital Computer Resale
call:713 445-0082
600 Kennick Ste C22
Houston, Tx 77060

SUBLEASE
XEROX 9700
Model 167
Laser Printer
2-3-4 Year Periods
Substantial Savings
Over Xerox
(201) 232-6255

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



Why Worry?

Let DANA Do Your Sweating!

For All Your IBM® Buy/Sell/Leasing Needs

DPD			GSD		
CPU	DISK	TAPE	CPU	PRINTER	TERMINAL
4341	3380	3420	S/34	5211	5251
4331	3375	3803	S/36	3262	5291
3081	3370		S/38	5224	
3083	3350			5225	

Authorized dealer for GBT® and Decision Data® Products
Printers and CRT's plug compatible to S/34, S/36, S/38

DANA MARKETING, INC.

800 433-4148

In California call 213 212-3111

Connecticut office 203 359-8040

SERIES/1

SAVE UP TO 60%
ALL MODELS & PERIPHERALS • NEW & USED
1, 2 & 3 YEAR RENTALS

IBM System/38

ALL MODELS • FEATURES & UPGRADES
SPECIAL LEASE PROGRAMS

IBM System/34

TOP SAVINGS • QUICK DELIVERY
SHORT & LONG TERM LEASES • MEMORY
FEATURES • UPGRADES

IBM System/36

ALL MODELS • QUICK DELIVERY
Special Option+Plus+Lease™ Plan

CALL TOLL FREE **800/328-5718**
IN MINNESOTA 612/544 • 8660

COMPUTER OPTIONS, INC.
1660 SOUTH HIGHWAY 100 • MINNEAPOLIS, MN 55416
COI *"Your best option"*

CDIA ascd

DEC®

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • ADD-ONS • TRADE-INS

VAX 780 2MB, RM05, TWE16, LP11YA, VMS LIC (USED)	$139,500
VAX 750 1MB, RUA81, TU80, DZ11-DP, LA120, VMS LIC (UNUSED)	$ 79,450
VAX 750 2MB, RUA81, TU80, LA120, VMS LIC (USED)	$ 64,750
VAX730 1MB, RUA80, TU80, DMF32, VMS LIC (NEW)	$ 49,500
11/70 512KB MOS, RWP06, TWE16 (USED)	$ 34,950
11/34A 256KB MOS, Dual RK07, H9642 CABINET (USED)	$ 9,350

Customized Configurations—Call With Your Request.

In Stock	Specials		In Stock
11/24-BC			LP11-EA
11/04-DC	DUP11-DA (USED)	$ 895	LP11-VA
1134A-YE	DZ11-DP (NEW)	$ 1,695	MS11-PB
1144-DA	FP750-AA (UNUSED)	$ 4,850	RK611-EA
BA11-KU	LP11-AA (UNUSED)	$ 6,950	RMO3-AA
DW750	MS750-CA (USED)	$ 2,450	RM05-AA
DZ11-F	RA81-AA (NEW)	$15,900	RP06-AA
H9642	RL02-AK (UNUSED)	$ 1,895	TS11-CA
LA12-AB	RP07-AA (USED)	$15,500	TWE16-AA
LA120-RA			VT220-AA

CALL FOR OUR FREE CATALOG.
DEC is the registered trademark for Digital Equipment Corp.

BROOKVALE ASSOCIATES
265 Oser Avenue Hauppauge NY 11788
4020 148th Ave NE Suite F Redmond WA 98052
800-645-1167 NEW YORK (516) 273-7777 WEST COAST (206) 881-2929

DEC
BUY — SELL — LEASE

VAX
11/730 11/750 11/780
SYSTEMS — MEMORY
OPTIONS — MODULES
NEW & USED

DEC TERMINALS
LA12AB LA12B
UNUSED
MAKE OFFER
MANY AVAILABLE

FUJITSU
ALL DRIVES AVAILABLE

EMULEX
CONTROLLERS
COMMUNICATIONS

DEC
OPTIONS — MODULES
MEMORY — SPARES

IBM
4978 MOD I 5285-CO5
3742 3771 3774

NATIONAL
COMPUTER EXCHANGE
600 NORTH LUNAR AVENUE
BREA, CALIFORNIA 92621
714-990-5988

800-624-9299

IBM SERIES I
PROCESSORS/ PERIPHERALS

4300
34
36
38

Phone
1-800-328-7938
(612) 941-9495
TWX 910-576-2916
ascd CDIA Member Computer Dealers & Lessors Association

data 3
computer corporation
11000 PRAIRIE LAKES DR. • EDEN PRAIRIE, MN • 55344

FORSYTHE McARTHUR ASSOCIATES, INC.

IBM 3803-2 Tape Control
IBM 3420-4's, 6's, 8's

for sale or lease NOW

Hdqtrs: **Skokie, IL (312) 675-8000**
Atlanta (404) 953-9457
Denver (303) 980-3407
Detroit (313) 332-1272
Milwaukee (414) 785-9544
Stamford, CT (203) 359-5649
St. Louis (314) 991-1716

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES 1.

NEW, USED, FEATURES, & CDC PERIPHERALS.
HARD TO FIND NEW PRODUCTS IN STOCK.

34, 36, 38.

S/36's UNDER IBM LIST.
72 HOUR UPGRADES, S/38 FEATURES.

4331/4341.

TAPE, DISK, PRINTERS,
FLEXIBLE LEASE ALTERNATIVES.

5110, 5120, S/23.

DISPLAYWRITERS IN STOCK NOW.

800/328-3884

IN MINNESOTA, CALL 612/936-9280

We do an exceptional job— our clients do repeat business.

X-ceptional!

XERXES COMPUTER SALES
10759 Bren Road East
Minnetonka, MN 55343

PCM

PIONEER COMPUTER MARKETING
11448 Pagemill Road • Dallas, Texas 75243
214/343-2904

To buy, sell, swap or lease, check PCM first!

Series/1 Equipment

FOR SALE or LEASE
495X CPU All Models
DISK: 4962 • 4963 • 4967
COM • FEATURES
• MEMORY •

FOR SALE
4954 A-B
4963 - ALL
4975 - 2L
Immediate Qty. Discounts

DISK UPGRADES
4963 29Mb to 64Mb
A's to B's/B's to A's
ALL SYSTEM 34 Upgrades

WANT to BUY
3310
A2/B2

BUYING
SERIES/1

WANTED:
SYSTEM
34 • 36 • 38

FORSYTHE McARTHUR ASSOCIATES, INC.

NEED TO BUY
4341-2's And 12's

Hdqtrs: **Skokie, IL (312) 675-8000**
Atlanta (404) 953-9457
Denver (303) 980-3407
Detroit (313) 332-1272
Milwaukee (414) 785-9544
Stamford, CT (203) 359-5649
St. Louis 314-991-1716

REAL ESTATE

DATA CENTER

FOR SALE OR LEASE
Near Ft. Laud. FL.
87,000 S.F. Bldg.
17,000 S.F. Raised Fl.
270 ton Carrier A/C
100 ton Liebert A/C
Sophisticated Security
337 KVA UPS
1000 KW Generator
Completed 1983, Expandable
Call 305-527-4400

The Bulletin Board

Buy • Sell • Lease **Buy • Sell • Lease** **Buy • Sell • Lease** **Buy • Sell • Lease**

DATA GENERAL

CRT's

D-211 ..... $950.
D-410 ..... $1,095.
D-460 ..... $1,295.

Ames Sciences, Inc.
(301) 228-8100

SPRING SALE
6168-XA D-210 Amber $895
6108 D-200 CRT $595
6053 D-2 CRT $495
6052 D-1 CRT $395
6074 LP2 180 CPS Printer $695
6073-LP2 180 CPS Printer $595
IQ120 Soruc CRT ..... $ 95
DT300 EECO CRT ..... $ 95
Data Investors Corp.(212) 675-1000

HEWLETT PACKARD

HP 3000

BUY • SELL • RENT • LEASE
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 458-2643 (800) 643-4954
Telex: 215 604 PCS UR

HP-250

SYSTEMS • PERIPHERALS • MEMORY
2622D Emulation Software
For HP-150/9816/125/IBM-PC
New & Used HP Personal Computers
XMITAL DATA COMM
(408) 747-1239

HP3000

SERIES 64 & 68 WANTED
CALL IMMEDIATELY
Referral Fees Available
213/458-2643
800/643-4954

PRIME

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

QANTEL

Qantel System For Sale:
Model 355 W/320K Mem,
150 MB Disk Dr, 1 Tape Dr
(1600), 3 Printers, 7 CRT's.
Under Maintenance Contract
Call **Jack Henderson**
Leach & Garner Company
(617) 222-7400 Ext. 207

MISC.

PRINTERS

Printronix P300 New/Color Graphics $4,995.00;
Data Products B300 New $3,795.00
Data Products B600 New $5,250.00

CompuCo Inc.
(919) 782-7950

Fairchild
Series 30/Model 303
In-Circuit In-Line Test System
Call Mike Buckshaw
At (203) 625-6778

MISC.

AIR CONDITIONER
Liebert 3ton Challenger2
Data Processing Control System
Mint Condition
Call P. Tiffany
(215) 667-2300

TANDEM NS-II STRATUS FT200

Available Now
Redwood Capital Corp.
(415) 921-3605

Buy • Sell • Lease
• Short Term Rentals •
IBM & DATAPOINT
AVAIL IMMEDIATELY
Cougar Computer Corp.
(216) 261-3500
Member CDLA

DEC

BUY-SELL-LEASE
DECISIONS?
DEC-VAX
SYSTEMS
VARGO Company, Inc.
(313) 254-2850
Guaranteed Equipment
CDLA DDA

DEC

DEC BARGAINS

11/34A CPU Set	$1,050
11/44 KE44-A 'CIS'	$2,775
11/44 CPU Set KD11Z	$4,300
BDV11-AA	$320
DL11-W	$185
DR780-AA	$3,400
FPF11	$1,075
FP11A	$995
KK11-A	$1,175
MS11-LD	$695
MS11-MB	$475
MS11-PB	1,985
MS780-DD	$2,000
MS780-E M8375	$3,500
MS780-E M8376	$3,300
MSV11-LF	$540
MSV11-PL	$1,080
VAX 1MB MS780-FD	$1,675

Call Ray at QEI, Inc. (617) 275-6800

DEC NEW & USED

BUY - SELL - EXCHANGE
VAX 730, R80, RL02,
DMF, LA120, VMS

BA11-KE	H9652-MF
BA11-KU	KD11-HA
DD11-DK	LP11-VA
DMR11-AC	MS11-PB
DMV11-AA	MSV11-PL
DR11-W	RH11
DRV11	RK711
DZ11-A	RK07-EA
DZ11-E	RL11
DZ11-DP	RM80-AA
FP750	TS11-CA
H9602-CC	VT102

LAKEWOOD COMPUTER CORP.
P.O. Box 23279
San Jose, CA 95153
(408) 266-2545

SPRING SPECIALS

M8210 ..... $ 199
LA120-DA, New 1,695
LP11-CA, New 6,450
RM05-AC, Unused 6,550
MS780-E, Unused 15,500
VAX 780 CPU 4MB, Used/Refurb $94,500
MS780-CC $2,095
TS11-CA, Unused $3,000
H7100-A $400
TU77 Master $10,950

DEC cables/Prime computers available

SEVCO INC.
(617) 435-6938
(617) 435-5331

DEC

VAX

SYSTEMS & OPTIONS SPECIALIST
C.D. SMITH & ASSOC. INC.
(713) 451-3112
ASK FOR C.D.

VT 220s

Only $935 ea.
Call Digital Computer Consulting
(617) 587-2900

VAX SYSTEMS

CUSTOM CONFIGURED TO MEET YOUR NEEDS
SELL-LEASE-RENT
BROOKVALE ASSOCIATES
800-645-1167 (516) 273-7777

ATTN VAX USERS

Discounted...

RUA81-CA
VT 240
VT 241
Floating Points
Upgrade Kits
Memory

Digital Computer Consulting
(617) 587-2900

11/23 PLUS SYSTEM

512 KB
(4) RL02's
(2) DZV11-C
Karmak Software
Carlinville, Illinois
(217) 854-4721

NEW VAX 750

Complete System
CPU w/ 2 MB
RUA81-AA Disk
TU80-AA Tape
DMF32-LP MUX
LA100-BA Console

$69,900

Save over $25,000
Access International
Glen Freeman (617) 367-3690

DEC

In Stock
2020 (Unused)
$15,995.
Digital Computer Resale
(713) 445-0082

BUY • SELL • TRADE

1123-BE	DMF32-LP	MS780-EA
1124-DC	DRV11-J	MS780-FD
1173-BC	DZ11-DP	RA60-CA
11725	KDF11-BE	RA60-P
BA11-KU	LA120-DA	RL02K-DC
DD11-DK	MS750-DC	RUA81-CA

NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

NEW VAX'S

11/750	DMF32-LP
XA-AE	LA100-BA
TU80	QD001-HM
RUA81-AA	QD001-DZ

Ready To Ship.
Clinton Digital, Inc.
(617) 877-9564

FOR SALE

VAX 11/780-CP, 1Mg
2 RMO3-AA
1 TE16-AE 1 H-9602-DF
2 DZ11-A 1 H7112-A
1 1200 LPM DATAPRINTER
Call or Write
Tony Cardona (809) 798-1475
P. O. Box 480
Bayamon, PR 00621

Unused Equipment

2	BA11-KU	$1995
4	DB11-A*	195
6	DD11-CF	150
1	DD11-DK	495
2	DL11-W	395
1	DZ11-C*	995
1	KE44-A*	1295
3	KK11-A*	1195
2	KT11-D*	195
1	LP11-WA*	1995
1	MK11-BE	495
1	RH780	1495
8	RK11D*	495
1	RM02-AA	3995
1	RM05-C	1495
1	RP06-C	495
3	TMB11*	495
1	TU77-FB	9995

* Factory carton
Call Carl Boehme at PCS, Inc. 208-322-1112

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

NCR

658 200MB DISKS FOR SALE
NCR 658 200MB Disk Drive.
NCR maintenance.
In Texas.
Call Jody Ripper
(415) 953-0377

IBM

FOR SALE

IBM 3705 Model J04 with features 1302, 1543, 1643, 4650, 4701, 4714.

IBM 3705 Model J04 with features 1302, 1543, 1643, 4650, 4701, 4714, 8002

IBM 3706 with features 1543, 1643, 4650, 4701, 4714

IBM 3033A24 with features 3832, 3850, 3868, 6850

2 Consoles; Power and coolant distribution with feature 5050. Power and coolant distribution with features 3824 and 5050. Multi processing communication unit with feature 3832. Attached processor with features 3832 and 6850.

For technical information call Larry Ellis (502) 564-8713. For bid forms call John Glenn (502) 564-2213.

Bids must be received by 1:00 p.m. May 8, 1985 and will be open at that time in the Division of Purchases, Personal Property Management, Room 255, Capitol Annex, Frankfort, Kentucky 40601.

IBM

Buy ..... Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(813) 722-4534
COMPUWARE

BUY-SELL-LEASE
34-36-38
Guaranteed Quality Service
Special Reduced Prices
New and Used Equipment
Carlyn Computer Systems, Inc.
800-828-4227
In VA (703) 642-1950

Fox Computer Sales
Buy • Sell • Rent • Lease
Datapoint • IBM Teletype
W.T.B.: Used Equipment
(216) 449-5205

SYSTEM/36 LEASING
Low Rates
Flexible Term
Midland Financial
(800) 328-9599
MN (612) 559-7171

NEW IBM SYSTEM 36
B23 ..... $36,575
Will Configure
FSG
(904) 589-4685

IBM

Want To Buy
System 38s
Call Bob Or Joe
800-433-4148
(213) 212-3111

***Special Sale**
3278-2
DISPLAY STATIONS
VARGO Company, Inc.
(313) 254-2850

SALE/LEASE
S/38/20
4 MB Processor
Peripherals Available
FOB Philadelphia - April 30
Call Ron Gibb (914) 238-9631
Computer Merchants Inc.

(31) 3350A2F
(49) 3350B2F
Eastern Airlines, Inc.
Herb Brown
(305) 873-6088

IBM PERIPHERALS

2501-B2	3540-B1
3178-C20	3747-1
3278-2	3830-2
3420-5 (5)	3880-4
3803-1	5251-12

Call (914) 238-9631
Computer Merchants Inc.

IBM

FOR SALE
AVAILABLE NOW
3420-8 Tape
3803-2 Tape Control
PACIFIC BELL
G. Weinmann
(415) 542-7928

FOR SALE/LEASE
4331-K2
$28,000 FOB Chicago
Available Now
Upgraded to
4361-L5
35% below IBM List
Call Bill Hegan (914) 238-9631
Computer Merchants Inc.

FOR SALE
5225-4
5340-F36 & F37
Amcom Corporation
1-800-328-7723

SYSTEM/38
SYSTEM/36
Systems & Upgrades
Memory, Communications,
Disk & Tape Drives
(713) 627-7117 (212) 279-4467

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(813) 863-2461

WANG

BUY - SELL
MVP/LVP • OIS • VS • PC
SYSTEMS IN INVENTORY
OIS-50 • 5536-4
GENESIS
EQUIPMENT MARKETING
GEM
(602) 277-8230

ERST Is The Leading Dealer
In WANG Equipment:
2200 • VS • WP • PC
Rentals & Leasing On Request
Toll Free: **1-800-FOR ERST**
In New York: **(212) 431-1100**
ERST
225 Lafayette, NYC 10012

Buy • Sell
Used
Wang Equipment
Guaranteed For Wang Maintenance
Holson Associates Inc.
2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley
or Carole Benson
(404) 980-1700

WANG VS 50A
128K CPU, 90 Meg Phoenix Drive, 2246S Serial Workstation, 5535 180CPS Matrix Printer $18,000 Negotiable.
Directories Publishing Co.
(904) 673-1241

Remanufactured
Wang equipment
Buy • Sell
Fully guaranteed. Eligible for Wang maintenance.
Call 800-FOR-WANG
(in NJ 201-489-0600)
174 S. Main St. Hackensack, NJ 07601

BURROUGHS

BUY SELL LEASE
BURROUGHS
B-20 to B-7900
SPECIAL 207 DISK
(10 Units)
B900 DISK PACK (206 Style)
Subsystem
DEPOT MAINTENANCE
Computer Provisions
(216) 248-7878

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRTs • Applications Software
SPECIAL
MLC 9101/9601
MLCP w/(8) RS232 Asynch Lines $3,975
PRU 9109/9609
900 LPM Drum Printer w/VFU.....$16,600
In Stock - Immediate Delivery
Boudreau Computer Services Ltd.
100 Bearfoot Rd.
Northboro, MA 01532
(617) 393-6839
TWX 710-347-7574

SOFTWARE FOR SALE

SOFTWARE WANTED

SHIP A DISK

Are you selling a software package? For the best results, advertise it in the **Software for Sale** section of Computerworld's classified pages. More than 600,000 computer-involved professionals receive Computerworld each week.

Place your ads today. Simply call toll-free at (800) 343-6474. In Massachusetts call collect at (617) 879-0700. Call now.

And don't forget to ask for your copy of our "1985 Quick Reference Rate Card" so you can find out how to earn linage discounts.

SOFTWARE CONVERSION SOLUTIONS

Dataware provides the software translation system for your complex conversion problems. Over 18 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- **COBOL to COBOL**
- **AUTOCODER / SPS to COBOL**
- **EASYCODER / TRAN to COBOL**
- **BAL / ALC to COBOL**
- **FORTRAN to FORTRAN**
- **PL / 1 to COBOL**
- **RPG / RPG II to COBOL**
- **RPG / RPG II to PL / 1**
- **DOS to OS**

Dataware offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People
Dataware, Inc.
A Computer Task Group Company
3095 Union Road
Orchard Park, NY 14127-1214
Phone: (716) 674-9310
TELEX: 510-100-2155

Award-Winning



Featuring:
- *Unsurpassed Documentation*
- *Large Scale Integration*
- *User-Defined Vocabulary*
- *Paperless Processing*

General Accounting	*Payroll/Personnel*
Accounts Payable	*Book to Tax Accounting*
Accounts Receivable	*Order Processing*
Equipment & Fixed Assets	*Inventory Management*
Financial Reporting	*Sales Analysis*
Planning & Budgeting	*Oil & Gas*
Job Cost Accounting	*Spread Sheet Processor*

J.D. Edwards & Company
4949 S. Syracuse / Suite 5500
Denver, CO 80237
303/ 773 3732

Dallas — 214/ 458 0636
Houston — 713/ 880 8278
San Francisco — 415/ 571 5755
Newport Beach — 714/ 955 0118
Bakersfield, CA — 805/ 327 1911
Tulsa — 918/ 493 1477

IBM Value Added Remarketer

DALLAS TRANSIT SYSTEM

Vehicle maintenance system, inventory control and personnel system for an IBM 4381 MVS/XA application software procurement announcement.

Pre-bid conference to be held April 26th 9:00 a.m. at the following address: Dallas Transit Systems, 201 North Teak Street, Dallas, TX 75226.

For a copy of the RFP contact: Jerry Robertson at 214-828-6704.

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

TIME & SERVICES

DEC REPAIR

All our Repair Prices are up to 25% less than DECmailer

VAX 780 • VAX 750 • VAX 730

THREE DELTA CORP.

2160 Del Franco St., San Jose, CA 95131
(408) 945-4200 TWX 910-339-9511

We repair all DEC equipment from LSI to VAX. —10 day turnaround with expedite service available— plus a 90 day warranty. At TDC, service is our only product.

DEC is a trademark of Digital Equipment Corp.

THE SOURCE FOR REMOTE PROCESSING

- On-line/Batch processing
- MVS, VM, DOS environments
- Block time available
- Nationwide access via Tymnet
- Xerox 9700 Laser Printer
- Disaster recovery services
- Decision support software including SAS and IFPS
- Bank processing services

Call **(919)469-3325** for more information or write to CompuSource c/o Marketing Division 1155 Kildaire Farm Road, Cary, NC 27511.

COMPUSOURCE

DATA PRINTER SALES • SERVICE

Model's 6644 - 1200 Series

Spares Discounts 10% to 30%
Per Call: Service, Ribbons
Refurbs, Maint Contracts

Printer Consulting Services
P.O. Box 265
Plantsville, CT 06479
(203) 621-8356

ICOTECH

Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing

COMPUTER OUTPUT MICROFILM

-Datagraphix Mini Auto-Coms
-Datagraphix Datamaster
-6250 BPI Capability
-Free Testing

Route 202
Raritan, NJ 08869
201-524-0153
Contact: Joyce Bogaenko

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCF
All Shifts Available
3370 Disk, 3420 Tape
800/1600 Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Restamatic Data Services
(212) 997-1439

DATA CENTER SERVICES

★ MILLENNIUM ★ NOMAD2
★ OS/MVS/SP ★ TSO/SPF
★ VM/370 ★ CICS
★ DOS/VSE/SCP ★ IMS/DBDC
★ CMS ★ RJE
★ TELENET ACCESS

Info Center Products
Access By Micros

EXCELLENT SERVICE LEVELS
COMPETITIVE RATES
VOLUME DISCOUNTS

BURNS COMPUTING SERVICES, INC.

MIDWEST: **312/981-5260** EAST COAST: **215/398-3600**

MILLENNIUM is a registered trademark of McCormack & Dodge

NOMAD2 is a trademark of D&B COMPUTING SERVICES, INC

VAX AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMPUTER TIME RENTAL AT DOWNTOWN NYC

MVS/TSO
Low flat rate available.
Call SIL, Inc.
(212) 747-9066

Tell Us About The **TIME & SERVICES** You Have To Offer...Here In **COMPUTERWORLD's** Classified Pages.

ADVERTISERS INDEX

Alpha Software Corp. SR/36
Altos Computer Systems SR/43-SR/45
Ampak Business Systems, Inc. SR/14
Ashton Tate SR/64-SR/65
Avatar Technologies SR/36,SR/38

B I Moyle Associates, Inc. 39
Banyan Systems SR/12-SR/13
BASF Systems SR/21
Beehive International 14-15,17
Boole and Babbage Inc. 8
Burroughs 28
Bytel Corp. SR/8

C. Itoh Digital Products SR/62
Cincom 23
Claremont Graduate School SR/28
Codex Corp. 66
Collier-Jackson, Inc. 60
ComDesign SR/34
Comm/Mart '85 6
Computer Associates SR/52-SR/53
Computer Information Systems 19
Computer Technology Group ID/2
Compuware Corp. 72-73
Consco Enterprises 59
Continental Resources SR/29,SR/55
Corodale 22
Cullinet 9
CW Benelux 68
CW Circulation 80
CW Corporate SR/66
CW Focus SR/37
CW Micro 62
CW Special Report 69
CXI, Inc. SR/39

Data General 32-33
Data Language Corp. SR/31
Datagram 24,76
Davis, Thomas & Associates 46
DICOMED Corp. SR/3
Digital Communications Associates 34-35
Digital Equipment Corp. 30-31
DJC Corp. SR/6
Dorlen Products 4

Enertronics Research SR/48
Ericsson Information Systems 56-57
Execucom Systems Corp. SR/57

Fibronics 51
Forte Data Systems SR/26
Fusion Products ID/6

General DataComm 58
Genesys Software 18
Group Operations, Inc. 10

H & W Computer Systems 12
Hewlett Packard ID/4-ID/5
Honeywell Information Systems . SR/60-SR/61

IBM ID/3,74-75
IDE Associates, Inc. SR/35
Innovation Data Processing 5
InTech SR/40
ISKRA Software International 28
Issco, Inc. 70-71

KMW Systems 50

Landmark Systems Corp. ID/16
Lanier Business Products SR/50-SR/51
Local Data 10

Mathematica 41
McCormack & Dodge 29
Memorex ID/14-ID/15
Michaels, Ross & Cole ID/11
Micro Focus SR/59
MicroFrame, Inc. 46
MicroRim Inc. SR/15-SR/20
Microtempus SR/49
Micro-Term ID/6
MIM 60
Mini & Micro Educational Services ID/16
Motorola/Four Phase Systems ID/12-ID/13
MSA 106
MTI Systems Corp. 68

National Computer 16
National Data 16
NCR Comten 43
NCR Corp. 78-79
NEC SR/11
Northern Telecom 42,63-65
Novell, Inc. SR/42

Oracle Corp. 47

Pacific Mountain States 45
PC Expo ID/8
Perkin Elmer SR/32-SR/33
Polaroid SR/54,SR/56,SR/58
Polygon Associates SR/28
Protocol Computers, Inc. ID/11

QINT Database Systems Corp. SR/41

Realia Inc. SR/30
RG Software Systems, Inc. SR/38
Rolm Corp. 54-55

SAMNA Corp. SR/4-SR/5
SAS Institute 11,20-21
Satellite Software International SR/22
Software House 40
Software International ID/10
Sperry Corp. SR/46-SR/47
SPSS Inc. SR/25
Storage Technology Corp. 81
Syncsort 3
Sysed 60
Systems Manufacturing Corp. 46

Tandem 77
Televideo Terminals 25
Telex Computer Products 48-49
Term-Tronics 13
Tone Software 46
Triangle Software 44
TRW SR/63

Unilease Computer Corp. 52
Uniq Digital Technology 38
USL Data Systems ID/7

Virtual Micro Systems SR/10
VM Software, Inc. 7

Wang Laboratories ID/9
Westwood Computer ID/8

XPoint Corp. ID/2
Xerox 26-27

Zenith Data Systems SR/24

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

Director/National Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Ronald Mastro
District Managers/Jim McClure, Michael F. Kelleher
David Peterson, Bill Cadigan
Account Manager/Sherri Driscoll
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
Midwest Regional Manager/Russ Gerches
District Managers/Arthur Kossack, Kevin McPherson
Sales Assistant/Jean F. Broderick
COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly, Fred Lo Sapio
Account Manager/Gale M. Patemo
Sales Assistant/Mary Burke, Sue Larson
COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bernie Hockswender, Robert Meth
Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260, Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Managers/Emie Chamberlain, Mark V. Glasner, Debora Cramer
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
Sales Assistant/Joyce Tye
COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319

HOUSTON SALES OFFICE (713) 952-1220
District Manager/William Mahoney
Western Regional Director/William J. Healey
COMPUTERWORLD, 8401 Westheimer, Suite 110, Houston, TX 77063

CLASSIFIED ADVERTISING (617) 879-0700
National Sales Manager/Walter S. Kett
National Recruitment Sales Manager/Al DeMille
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diana La Muraglia
Manager, East Coast/Frank Cutitta
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Isabella Barbagallo
COMPUTERWORLD, 1060 Marsh Road Menlo Park, CA 94025
(415) 328-8064

CW COMMUNICATIONS/INC.

Board Chairman
Patrick J. McGovern
President
W. Walter Boyd
Executive Vice-President
Lee Vidmer

Publisher/Vice-President, Donald E. Fagan. **Group VP-Communication Services**, Jack Edmonston. **Group VP-Circulation**, Margaret Phelan. **VP-Finance**, William P. Murphy. **VP-Editorial**, John Whitmarsh.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES **National Director**, Edward P. Marecki. **National Sales Manager/Classified Advertising**, Walter S. Kett. **Manager/Marketing & Sales Operations**, Kathy Doyle. **Corporate Advertising Administrator**, Frank Collins. **National Recruitment Sales Manager**, Al DeMille. **Display Advertising Manager**, Anne Hadley. **Display Advertising**, Maureen Carter, Carolyn Medeiros, George W. Griffin, Suzanne Weixel, Lisa Morse. **Classified Operations Manager**, Cynthia Delany.

COMMUNICATION SERVICES **Group Vice-President**, Jack Edmonston. **Director Research**, Kathryn Dinneen. **Sales Promotion Director**, Liz Johnson.

PRODUCTION **Production Director**, Peter Holm. **Production Manager**, Marlene Stibal. **Paste-Up Manager**, Trish Gaudette. **Typesetting Manager**, Carol Polack. **Art Director**, Tom Monahan.

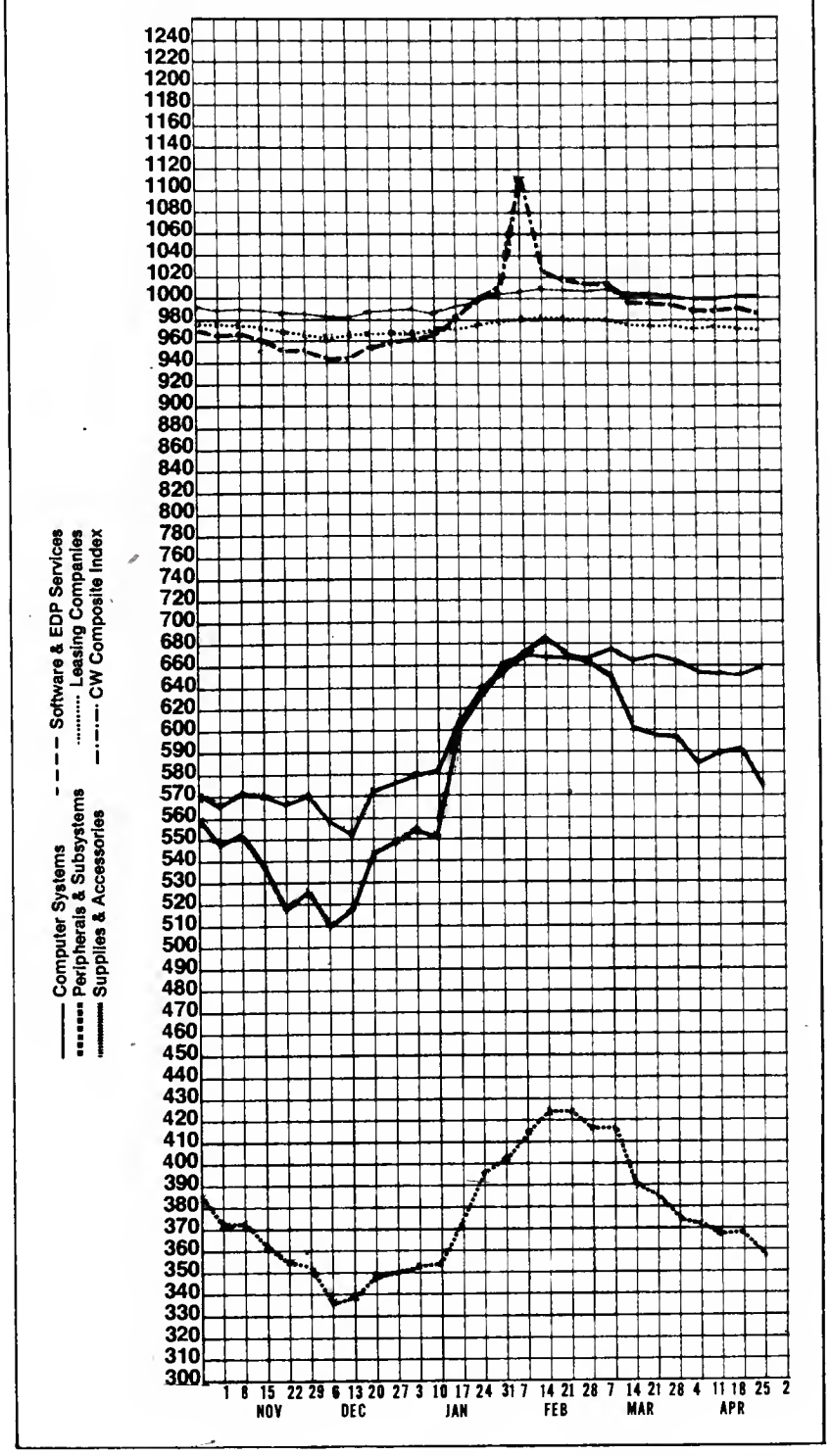
CIRCULATION **Group Vice-President**, Margaret Phelan. **Circulation Manager**, Jane Desberg. **Fulfillment Manager**, Maureen Burke.

CONFERENCE MGT. GROUP **President**, William R. Leitch.

SYSTEMS **Systems Manager**, Thomas Pfau.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 24, 1985

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass 02139

EXCH		1985 RANGE (1)	CLOSE APR 24 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	6- 24	7 1/4	- 3/8	-4.9
O	ALTOS COMPUTER SYST	7- 21	11 1/8	0	0.0
A	AMDAHL CORP	10- 19	13 1/2	- 1/4	-1.8
O	APPLE COMPUTER INC	18- 63	22	- 5/8	-2.7
N	AT&T	15- 22	21 1/2	+ 5/8	+2.9
N	BURROUGHS CORP	48- 64	61 1/4	0	0.0
O	COMPAQ COMPUTER CP	4- 15	9	+ 5/8	+7.4
O	COMPUTER AUTOMATION	3- 17	6 3/4	- 5/8	-8.4
A	COMPUTER CONSOLES	7- 20	7 3/8	- 7/8	-10.6
N	CONTROL DATA CORP	25- 39	30 1/8	+1 5/8	+5.7
O	CONVERGENT TECHNOL	5- 43	7 5/8	-1 1/4	-14.0
N	CRAY RESEARCH INC	39- 79	72 5/8	+2 3/8	+3.3
O	DAISY SYSTEMS CORP	24- 36	28	-2 1/2	-8.1
N	DATA GENERAL CORP	39- 74	58 3/4	-7	-15.3
N	DATAPOINT CORP	13- 26	13 3/4	- 1/4	-1.7
N	DIGITAL EQUIPMENT	77-125	103 3/8	-5 1/2	-5.0
A	EECO INC	12- 16	14 1/4	- 1/4	-1.7
N	ELECTRONIC ASSOC.	3- 7	4 3/4	0	0.0
N	FLOATING POINT SYST	13- 31	25 3/8	-1 3/8	-5.1
N	FOXBORO	26- 36	29	0	0.0
O	GENERAL AUTOMATION	5- 16	5 1/2	0	0.0
N	GOULD INC	20- 32	21 7/8	-2 3/4	-11.1
N	HARRIS CORP	23- 35	25 1/4	-1 1/8	-4.2
N	HEWLETT-PACKARD CO	31- 44	34	- 3/4	-2.1
N	HONEYWELL INC	46- 69	57 1/8	- 3/4	-1.2
N	IBM	99-137	128 5/8	-1	-0.7
O	IPL SYSTEMS INC	1- 14	2	- 3/8	-15.7
N	ITT CORP	21- 42	33 7/8	+ 3/8	+1.1
N	M/A-COM INC	13- 24	19 1/8	- 1/4	-1.2
N	MANAGEMENT ASSIST	3- 29	2 7/8	- 1/8	-4.1
N	MITSUSHITA ELEC(ADR)	52- 81	59 1/8	+1 3/4	+3.0
N	MODULAR COMPUTER SYS	6- 10	6 5/8	0	0.0
N	MOHAWK DATA SCI	4- 17	3 7/8	+ 1/4	+6.8
N	MOTOROLA INC	29- 44	31 3/4	-3	-8.6
N	NAT'L SEMICONDUCTOR	11- 17	10 3/4	- 1/2	-4.4
N	NBI INC	13- 24	14	+ 3/4	+5.6
N	NCR	21- 31	27 1/4	0	0.0
N	PERKIN-ELMER	18- 30	22 3/4	- 7/8	-3.7
N	PRIME COMPUTER INC	11- 20	15 1/2	- 3/4	-4.3
N	SPERRY CORP	35- 54	51 1/4	+1 5/8	+3.2
O	STRATUS COMPUTER INC	9- 17	14 1/4	- 1/4	-1.7
O	TANDEM COMPUTERS INC	15- 40	18 1/2	-2 1/8	-10.3
N	TANDY CORP	24- 37	30 3/4	-3 1/4	-9.5
O	TELEVIDEO SYSTEMS	3- 41	3	+ 1/8	+4.3
O	TELXON CORP	8- 20	19 1/2	0	0.0
N	TEXAS INSTRUMENTS	93-150	93 3/8	-16 3/4	-15.2
A	ULTIMATE CORP	10- 24	13 7/8	+ 3/8	+2.7
O	VECTOR GRAPHICS INC	0- 9	3/4	0	0.0
A	WANG LABS "B"	17- 32	17	-2 1/2	-12.8
A	WANG LABS "C"	17- 32	17	-2 7/8	-14.4
N	XEROX CORP	35- 47	46 7/8	+ 1/8	+0.2
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	10- 22	18 3/4	- 5/8	-3.2
A	CMI CORP	4- 10	8 3/8	- 1/8	-1.4
N	COMDISCO INC	8- 17	15	- 3/4	-4.7
O	CONTINENTAL INFO SYS	5- 18	7 3/4	0	0.0
N	DPF INC	10- 17	15 1/2	- 3/8	-2.3
O	FINALCO GROUP INC	4- 12	4	+ 1/8	+3.2
O	PHOENIX AMERICAN INC	2- 17	2 3/8	- 1/4	-9.5
O	SELECTERM INC	8- 21	9 1/4	0	0.0
N	U.S. LEASING	29- 44	38	-1 1/4	-3.1
	COMPONENTS				
N	ADVANCED MICRO DEV	25- 41	29 1/8	-2 1/8	-6.7
O	ADV'D SEMICONDUCTOR	12- 28	12	- 3/4	-5.8
N	ANALOG DEVICES INC	16- 25	19 7/8	-1 1/8	-5.3
O	ANALOGIC CORP	10- 31	13	+ 3/8	+2.9
N	APPLIED MAGNETICS CP	9- 21	13	- 3/8	-2.8
O	HADCO CORP	4- 12	4 3/8	- 1/2	-10.2
O	MICRO MASK INC	8- 19	8 1/4	- 3/8	-4.3
N	TERADYNE	22- 35	23 1/8	-2	-7.9

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1985 RANGE (1)	CLOSE APR 24 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	2 5/8	+ 1/8	+5.0
N	ADVANCED SYSTEMS INC	9- 22	9 1/2	- 7/8	-8.4
O	AGS COMPUTERS INC	10- 32	13 3/8	+1 1/4	+10.3
O	AMERICAN SOFTWARE	8- 20	12	- 3/4	-5.8
N	ANACOMP INC	1- 5	3 7/8	- 1/4	-6.0
O	ANALYSTS INTL CORP	5- 17	9	-1 1/2	-14.2
A	APPLIED DATA RES	18- 38	32 3/4	+ 3/4	+2.3
O	ASHTON TATE	6- 15	8 7/8	- 3/8	-4.0
O	ASK COMPUTER SYSTEMS	13- 24	15 1/2	- 1/2	-3.1
B	ASTRADYNE COMP IND.	1- 7	2 1/4	+ 1/4	+12.5
N	AUTOMATIC DATA PROC	30- 46	42 3/4	-1 1/4	-2.8
O	COMPUTER ASSOC INT'L	15- 75	25 3/4	+ 1/2	+1.9
O	COMPUTER HORIZONS	8- 20	7 7/8	- 1/4	-3.0
O	COMPUTER NETWORK	5- 11	7 1/2	0	0.0
N	COMPUTER SCIENCES	11- 17	14 5/8	- 1/8	-0.8
O	COMPUTER TASK GROUP	12- 22	22	+ 1/2	+2.3
O	COMPUTER USAGE	1- 18	1	- 1/4	-20.0
O	COMPUTONE SYSTEMS	4- 23	8 3/8	- 1/4	-2.8
O	COMSERV CORP	3- 16	8	0	0.0
O	COMSHARE	6- 14	9 7/8	+ 1/4	+2.5
N	CULLINET SOFTWARE	12- 33	26 7/8	-1 1/8	-4.0
O	CYCARE SYSTEMS INC	16- 27	22 1/2	+1	+4.6
O	HOGAN SYSTEM INC	5- 27	5 1/4	- 3/8	-6.6
N	GENERAL ELECTRIC CO	48- 65	60 5/8	+1 3/8	+2.3
N	GENL MOTORS E (EDS)	33- 72	66 1/4	+4 1/4	+6.8
N	GTE CORP	36- 45	40 5/8	- 1/8	-0.3
N	INFORMATICS GENERAL	14- 24	24	+ 1/4	+1.0
O	INFORMATION SCIENCE	2- 17	2	- 3/8	-15.7
O	INFOTRON SYSTEMS CP	15- 43	21 3/4	+ 3/4	+3.5
O	KRANZ ASSOCIATES	6- 15	14 3/4	+ 3/4	+5.3
A	LOGICON	18- 34	33 3/8	- 1/2	-1.4
O	LOTUS DEVELOPMENT CP	15- 40	28 3/4	- 1/4	-0.8
O	MCI COMMUNICATIONS	6- 28	9	- 1/8	-1.3
O	MGMT SCI AMER INC	9- 33	13	- 1/8	-0.9
O	MATHEMATICAL APP GRP	6- 18	5 1/2	0	0.0
O	MICOM SYSTEMS INC	25- 50	24 3/4	- 3/4	-2.9
O	MICROPRO INT'L CP	2- 10	2 5/8	0	0.0
O	NATIONAL DATA CORP	8- 26	11 1/2	+ 3/8	+3.3
O	ON-LINE SOFTWARE INT	4- 28	6 3/4	+ 1/4	+3.8
O	PANSOPHIC SYSTEMS	11- 30	18 5/8	+1 1/8	+6.0
N	PLANNING RESEARCH	10- 15	12 1/8	+ 5/8	+5.4
O	POLICY MGMT SYSTS CP	22- 35	26 3/4	-1	-3.6
O	PROGRAMMING & SYS	4- 8	5 1/4	0	0.0
O	REYNOLDS & REYNOLD	28- 53	38 3/4	- 3/4	-1.8
O	SFI CORP	11- 34	18 1/4	- 1/2	-2.6
O	SHARED MEDICAL SYST	23- 43	30	- 3/4	-2.4
O	SCIENTIFIC COMPUTERS	5- 14	6 5/8	- 1/8	-1.8
O	SOFTWARE AG	9- 21	14 1/8	- 1/8	-0.8
N	SRS CORP	10- 14	11 5/8	- 1/4	-2.1
N	UCCEL	7- 17	13 3/4	- 1/4	-1.7
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	4	- 1/4	-5.8
A	ANDERSON JACOBSON	2- 11	2 5/8	- 3/4	-22.2
O	AST RESEARCH INC	7- 20	18 7/8	- 1/4	-1.3
O	AUTO-TROL TECHNOLOGY	7- 29	7 1/2	+ 1/4	+3.4
O	AVANT-GARDE COMPUTNG	11- 28	12 1/4	0	0.0
O	BANCTEC INC	5- 22	10 1/4	- 1/4	-2.3
A	BEEHIVE INT'L	1- 7	3/4	- 1/4	-25.0
N	BOLT,BERANEK & NEW	17- 30	26 1/2	-1 3/4	-6.1
C	CAMPEX CORP	1- 3	1 3/4	0	0.0
N	CENTRONICS DATA COMP	4- 14	8 3/4	- 3/8	-9.0
A	CETEC CORP	7- 12	6 3/4	- 1/4	-3.5
A	COGNITRONICS	4- 9	4 7/8	0	0.0

EXCH		1985 RANGE (1)	CLOSE APR 24 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	26- 37	29 5/8	-1 3/8	-4.4
O	COMPUTER TRANSCEIVER	1- 10	7/8	- 1/8	-12.5
N	COMPUTERVISION CORP	16- 46	16	-1 3/8	-7.9
N	CONRAC CORP	11- 17	13 3/4	- 1/4	-1.7
A	DATAPRODUCTS CORP	12- 26	12 1/4	-1 1/4	-9.2
A	DATARAM CORP	4- 12	4 3/4	- 1/4	-5.0
O	DATA SWITCH CORP	4- 41	4 3/8	- 5/8	-12.5
O	DATUM INC	5- 17	6	- 1/8	-2.0
O	DECISION DATA COMPUT	9- 19	14	- 5/8	-4.2
O	DOCUTEL-OLIVETTI	3- 39	5 1/8	0	0.0
N	ELECTRONIC M & M	5- 9	8 3/4	- 3/8	-4.1
O	ENDATA, INC	5- 16	5	+ 1/4	+5.2
O	EVANS & SUTHERLAND	11- 50	13	- 1/2	-3.7
O	GANDALF TECHNOLOGIES	7- 14	6 3/4	- 1/8	-1.8
N	GEN'L DATA COMM IND	13- 20	13 3/8	- 1/2	-3.6
A	HAZELTINE CORP	23- 33	26 1/4	- 1/8	-0.4
O	ICOT CORP	3- 8	4 1/2	- 5/8	-12.1
O	INFORMATION INTL INC	10- 19	13 1/4	- 1/4	-1.8
O	INTECOM INC	6- 21	5 5/8	- 3/8	-6.2
O	INTF. CORP	25- 45	27 3/8	-1 7/8	-6.4
A	LUNDY ELECTRONICS	7- 13	12 3/4	+ 1/4	+2.0
O	MEGADATA CORP	3- 8	5 3/4	- 1/4	-4.1
A	MSI DATA CORP	8- 19	7 3/4	-1 1/4	-13.8
N	NASHUA CORP	19- 29	26 3/8	- 7/8	-3.2
O	NETWORK SYSTEMS CORP	16- 34	22 1/4	+ 1/2	+2.2
N	NV AMERICAN PHILIPS	30- 45	39 1/8	- 5/8	-1.5
N	NORTHERN TELECOM LTD	30- 42	35 1/4	0	0.0
O	OMEX	1- 6	1/8	0	0.0
N	PARADYNE CORP	11- 18	13 1/8	- 5/8	-4.5
A	PENRIL CORP	9- 14	12 3/8	- 3/4	-5.7
N	PLESSEY CO (ADR)	20- 35	24	-1 1/2	-5.8
O	PRINTRONIX INC	12- 34	12 1/4	-1 1/4	-9.2
O	QMS INC	8- 17	11 5/8	-1 1/8	-8.8
O	RAMTEK CORP	4- 23	4 5/8	+ 1/4	+5.7
N	RECOGNITION EQUIP	10- 17	12 3/8	- 3/8	-2.9
N	SANDERS ASSOCIATES	32- 51	37	+1 3/8	+3.8
O	SCAN-TRON CORP	9- 19	12 3/8	+ 3/4	+6.4
N	SCIENTIFIC ATLANTA	8- 14	11 3/4	+ 1/4	+2.1
O	SEAGATE TECHNOLOGY	4- 20	6 1/8	- 7/8	-12.5
N	STORAGE TECHNOLOGY	2- 12	3 1/8	+ 1/2	+19.0
O	SYKES DATATRONICS	1- 13	3/4	- 1/16	-7.7
A	T BAR INC	7- 11	7 3/4	- 3/8	-4.6
A	TAB PRODUCTS CO	13- 20	18	- 1/8	-0.6
O	TANDON CORP	6- 35	5 1/2	- 1/8	-2.2
A	TEC INC	8- 13	12 1/2	+ 1/8	+1.0
N	TEKTRONIX INC	52- 88	58	-1 3/4	-2.9
N	TELEX	19- 47	43	+ 1/2	+1.1
O	TESDATA SYSTEMS CP	2- 17	2	+ 3/8	+23.0
N	TIMEPLEX INC	13- 23	16 7/8	+ 3/8	+2.2
O	VISUAL TECHNOLOGY	2- 26	1 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 27	26 1/4	- 1/2	-1.8
N	BARRY WRIGHT	21- 33	21 5/8	+ 3/8	+1.7
A	DUPLEX PRODUCTS INC	22- 32	31 3/4	+ 3/8	+1.1
N	ENNIS BUS. FORMS	18- 38	34 1/8	0	0.0
N	3M COMPANY	69- 86	79 3/4	+1 7/8	+2.4
N	MOORE CORP LTD	35- 53	51 5/8	+ 1/2	+0.9
O	STANDARD REGISTER	27- 57	54 1/2	+2 1/4	+4.3
N	WALLACE COMP SERVICE	23- 38	35 3/8	+ 5/8	+1.7

MSA WE ADD THE GENIUS TO COMPUTERS.℠

The Software Company



FINALLY. THE TECHNOLOGY THAT OPENS THE DOOR TO BORDERLESS RETRIEVAL.

INFORMATION EXPERT™ FROM MSA.

Retrieval. ▤ Until now, that meant manual. Because each different application system had different reporting.Which you had to learn. ▤ But MSA has changed that forever. With Information Expert (I.E.). The mainframe software tool that lets you retrieve information from multiple systems in one step. At one time. Even if they aren't MSA systems. ▤ I.E. is built around the data dictionary concept. So there's only one reporting facility to learn. ▤ Then there's friendly, step-by-step reporting for the first-time user. Powerful, more than fourth-generation language and full-screen editing for the data processing professional. And more. ▤ To find out, contact Robert Carpenter at (404) 239-2000. Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326. ▤ One-step retrieval with Information Expert. It's advanced. It's simple. And it's here today. ▤